



# HARMONY

TOON BOOM HARMONY 12.1

- Advanced Edition -

**Getting Started Guide**

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## **Legal Notices**

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# Chapter 1: Introduction

Harmony is a complete animation software allowing you to create all kinds of creative animation projects. It comes with a very wide variety of tools and features.

In the Getting Started Guide, you will learn about the main features covering the basic concepts of Toon Boom Harmony, which will quickly bring you up to speed. Refer to the complete Toon Boom Harmony documentation available online at [docs.toonboom.com](https://docs.toonboom.com) to learn about all the tools and options, as well as advanced techniques.

This guide is divided as follows:

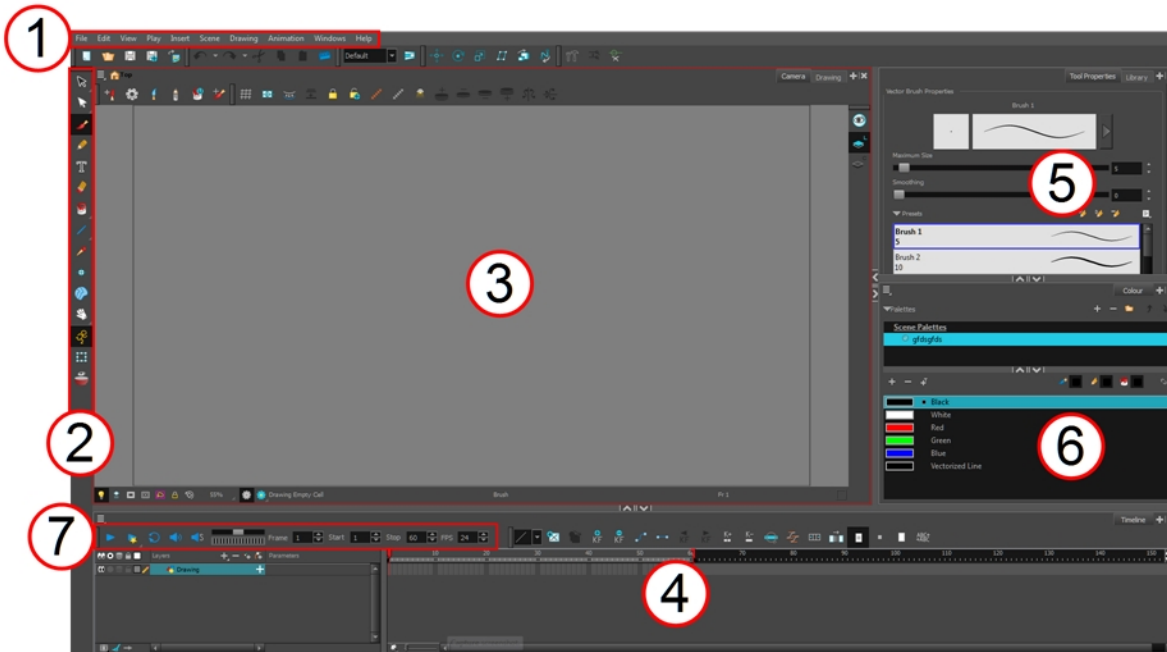
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## Chapter 2: About the Interface

It's important that you become familiar with the following elements of the user interface as this will help you to start using Toon Boom Harmony. You can learn more about the highlights described here, and how to use them in a production context, throughout this guide.

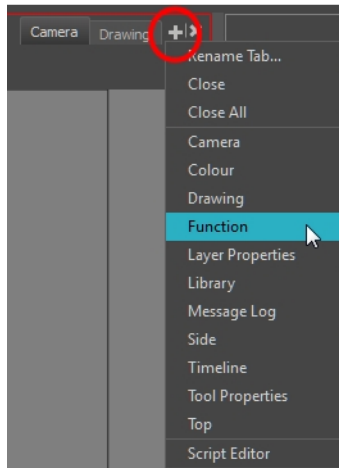
When you start Toon Boom Harmony for the first time, the default workspace is displayed. It contains all of the main elements you need to use.



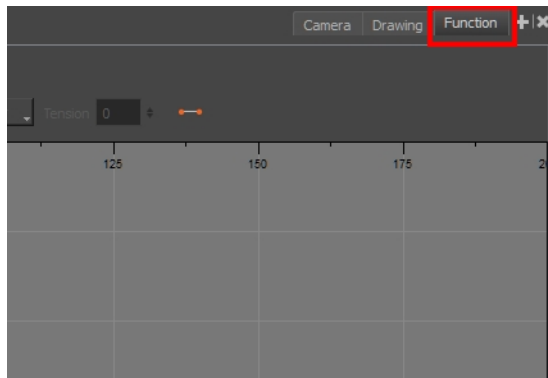
1. Menus
2. Tools toolbar
3. Camera view
4. Timeline view
5. Tool Properties view
6. Colour view
7. Playback toolbar

### How to add a view

1. Do one of the following:
  - ▶ Select the view you want to add from **Windows > desired view**.
  - ▶ In the top-right corner of a view, click the Add View **+** button and select a view from the list. You can open several instances of the same view except for the Timeline, Tool Properties, Colour, and Drawing views.

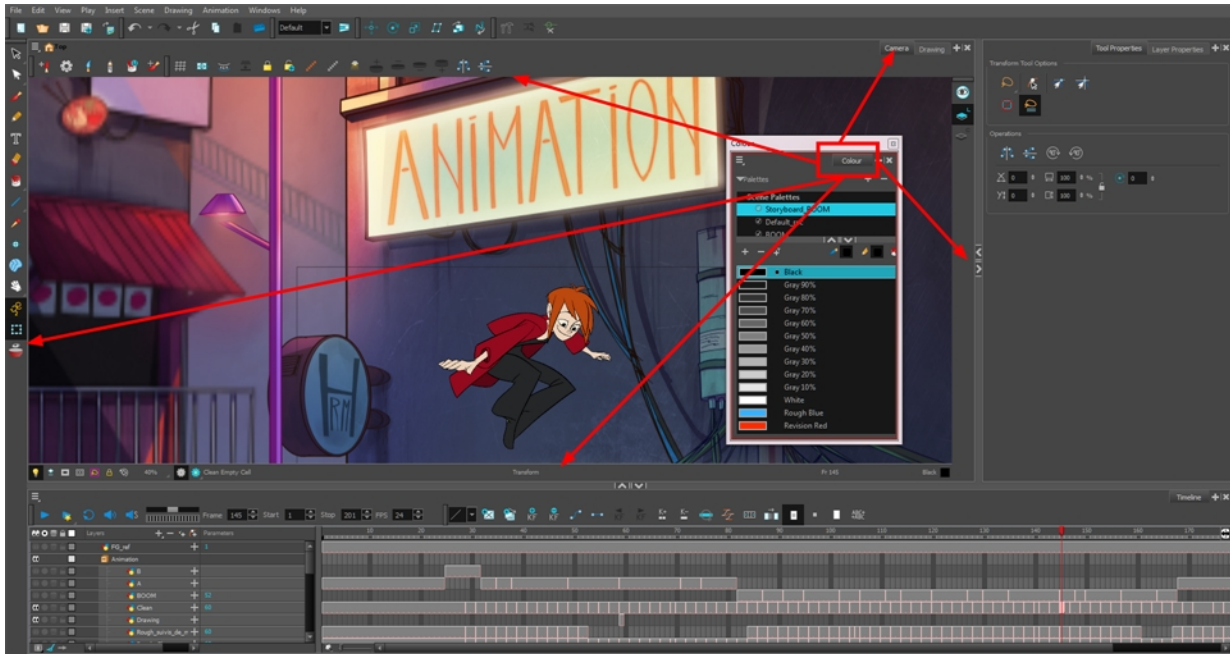


By default, the view appears as a tab.



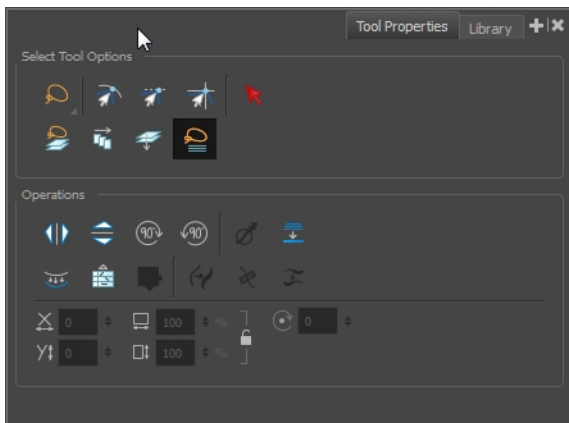
### How to dock a window

1. Drag a window by its tab and do one of the following:
  - ▶ Drop the window onto other existing tabs to add it to the others.
  - ▶ Drop the window above, below or beside an existing view. When you get close to the edge of a view, a black rectangle with a blue background appears, indicating where the view will be inserted.




Window is dragged by its tab onto other tabs or above/below/beside other views.

## Tool Properties View



The contextual Tool Properties view contains the most common options and operations related to the currently selected tool. When you select a tool from the Tools toolbar, the Tool Properties view is updated.

For example, if you choose the Select  tool in the Tools toolbar, the Tool Properties view displays the options and operations related to the Select tool, such as Snap to Contour, Snap and Align, Flip Horizontal and Flatten.

## Interface Navigation

Toon Boom Harmony lets you zoom in, zoom out, rotate, pan and reset views for easy navigation of the interface.

| Command | Action             | Access Methods  |
|---------|--------------------|---|
| Zoom In | Zooms in the view. | <b>View &gt; Zoom In</b><br>Press 2 or roll the mouse wheel up. |

|                       |  |   |
|-----------------------|--|---|
|                       |  | In the Timeline view, roll the mouse wheel up.  |
| Zoom Out              | Zooms out the view.  | <b>View &gt; Zoom Out</b><br>Press 1 or roll the mouse wheel down.<br>In the Timeline view, roll the mouse wheel down |
| Zoom In or Out        | Zooms in or out of the view.   | Roll the middle mouse button up or down.  |
| Pan                   | Moves parallel to the view.  | Hold down the Spacebar and drag n in the direction in which you want to pan the view.                                 |
| Recenter view         | Recenters the view on the pointer.   | Press N   |
| Reset Pan             | Resets the view's pan to its default position.   | <b>View &gt; Reset Pan</b><br>Press Shift + N   |
| Reset View            | Resets the view to its default position.   | <b>View &gt; Reset View</b><br>Press Shift + M  |
| Reset Rotation        | Resets the view's rotation to its default position.  | <b>View &gt; Reset Rotation</b><br>Press Shift + X  |
| Reset Zoom            | Resets the view's zoom to its default position.  | <b>View &gt; Reset Zoom</b>   |
| Toggle Full Screen    | Enlarges the selected view to full screen which is done in three stages.<br><br>First, the selected view enlarges to the maximum width or height, but keeps the tool views such as Colour or Tool Properties view.<br><br>Second, the view enlarges to full screen.<br><br>Third, the view returns to its original size. | <b>View &gt; Toggle Full Screen</b><br>Press Ctrl + F<br>(Windows/Linux) or ⌘ + F<br>(Mac OS X)                       |
| Rotate 30 CW          | Rotates the Camera view 30 degrees clockwise, like an animation table.   | <b>View &gt; Rotate View CW</b>   |
| Rotate 30 CCW         | Rotates the Camera view 30 degrees counter-clockwise, like an animation table.   | <b>View &gt; Rotate View CCW</b>  |
| Toggle Quick Close-up | Use the Magnifier tool to quickly  |   |

|  |   |  |
|--|---|--|
|  | <p>center on the mouse position and zoom in to a pre-defined value such as 4X. Then you can zoom out again. Hold the Shift key and press Z to zoom in and back out again. Replace the Reset Zoom by pressing Shift +.</p> <p>The area where you zoom in or out is dependent on the pointer location in the Camera view. If you zoom in and then move the pointer to a different location when you zoom out the mouse will be centered on that location.</p> |  |
|--|---|--|

**NOTE:** If you're using a tablet or track pad that supports touch, then you can also use the standard two-finger gestures to zoom, rotate, and pan the Camera and Drawing views.




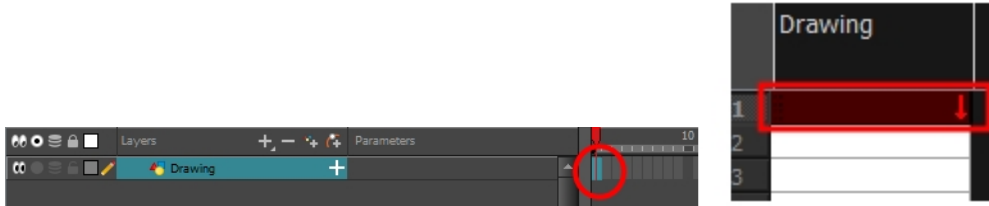


## Chapter 3: How to Draw

As soon as Toon Boom Harmony is started, you can start to draw straight away using the default drawing layer.

### How to draw

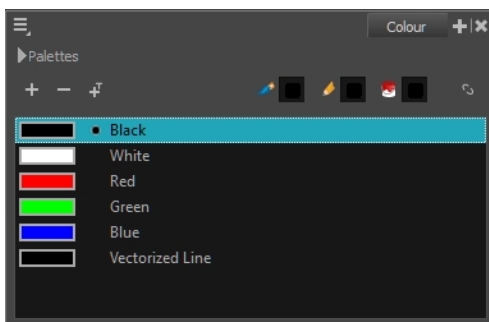
1. In the Tools toolbar, select the Brush  tool or press Alt + B.
2. In the Timeline or Xsheet view, click in the first cell of the drawing layer.



3. In the Drawing or Camera view, start drawing.



4. To select a different colour, in the Colour view, select a different colour swatch. Double-click on the colour swatch to open the Colour Picker window and change the colour. Remember that anything already painted with that colour will update to the new colour.



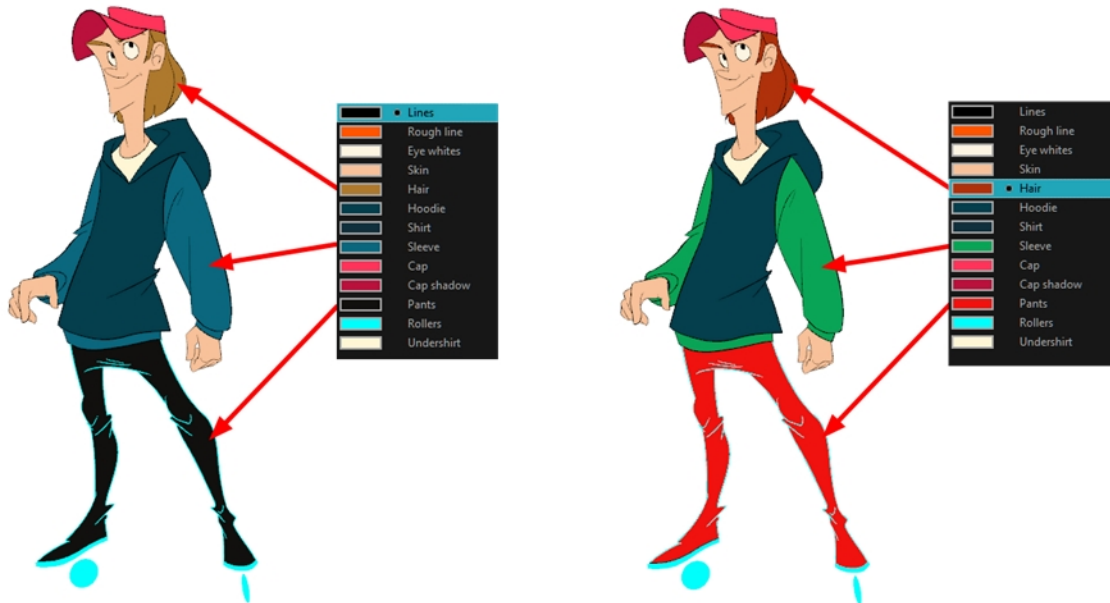


## Chapter 4: How to Paint

Toon Boom Harmony has some very powerful colouring features when it comes to painting. To paint your drawings, you will use different colour swatches, unlike some other painting programs where you modify the main swatch each time you want to paint with a different colour.



In the Colour view, you choose a different colour swatch for each colour you want to paint in your drawing. You can add as many swatches as you want. You can also rename them and modify existing ones.



When you modify the colour of an existing swatch, it automatically updates all the zones painted with this swatch throughout the entire project. The colour swatch has a unique ID number that associates it with the painted zones. This way, you can change the look of your character at any time without having to repaint it!

In animation, specific colours are used to paint each particular character. In order to maintain absolute consistency, a colour palette is created for each character, prop and effect throughout the production. This is referred to as a **master palette**<sup>1</sup>.

Master palettes contain a colour swatch for each zone to colour with a precise RGBA colour value.


Using a master colour palette has many benefits, including:

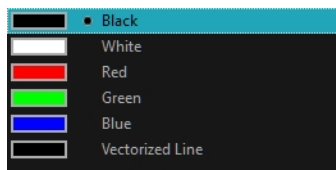
- Each character consistently retains their dedicated colours.
- You cannot accidentally use a colour which is not in the master palette.
- Standardization and colour consistency throughout the production
- Multiple artists can use the same colour palette and produce the same results.

Toon Boom Harmony uses palettes to hold all the colours needed to paint your elements, allowing complete control and consistency in your painting process.

A **palette**<sup>2</sup> is created by assigning a set of colours to each character, prop or effect. You will create a new palette and add a new colour, known as a *colour swatch*, for each zone of the character, such as the skin, hair, tongue, shirt, pants, and so on.

### How to paint drawings

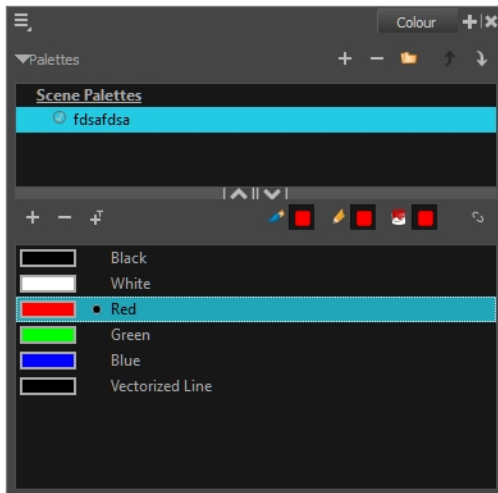
1. In the Timeline or Xsheet view, select the drawing you want to paint.
2. In the Tools toolbar, select the Paint  tool or press Alt + I.
3. In the Colour view, select a palette.
4. Select a colour from the palette.
  - If you are working with vector layers, double-click on a colour swatch to open the Colour Picker window and modify the colour.



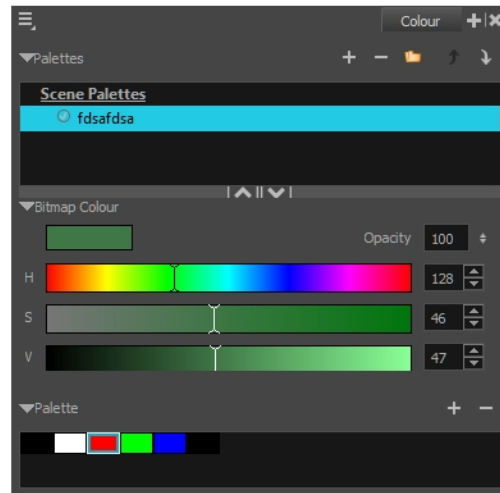
- If you are working with bitmap layers, use the RGB/HSV controls to select a colour.

<sup>1</sup>A master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire production to maintain consistency in the look and to ensure that the same colours are used throughout the production. Also known as palette.

<sup>2</sup>A palette or master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire Toon Boom Studio project to maintain a consistency in the look and avoid the colour changing during the animation. Also referred to as a master palette.



Colour view when working with vector layers



Colour view when working with bitmap layers

**NOTE:** The colour palette only appears in the Colour view when you select a drawing element.

- In the Drawing or Camera view, start painting the colours on your drawing.





## Closing Gaps

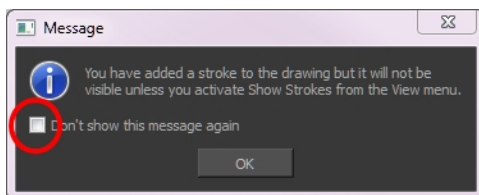


When painting, notice that some of your drawing areas are not closed. To close the zone, you can draw the missing line with the Brush or Pencil tool or close the gap with an invisible line. To do so, you will use the Close Gap tool.

The Close Gap tool lets you close small gaps in a drawing. The Paint tool only paints closed areas. The Close Gap tool creates small, invisible strokes between the two closest points to close the colour zone. You do not need to trace directly over the gap. You can draw it a few millimetres away and the Close Gap tool will automatically choose the two closest points and close the gap.

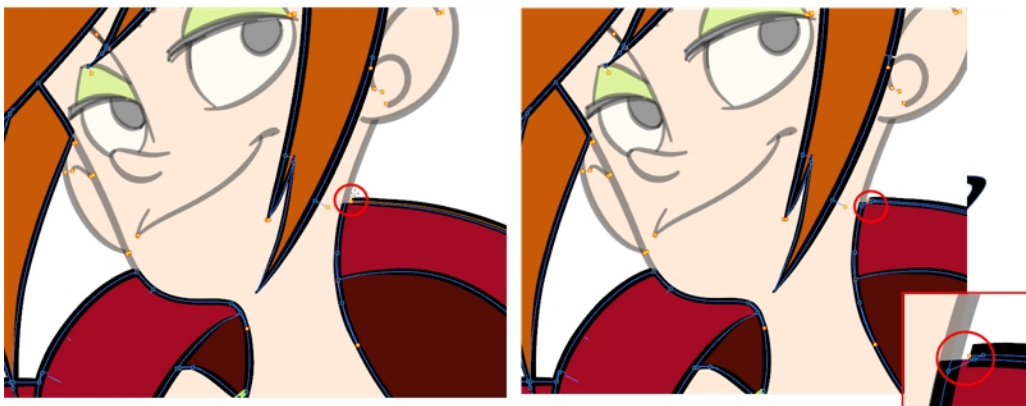
### How to use the Close Gap tool

1. Do one of the following:
  - ▶ In the Tools toolbar, select the Close Gap  tool.
  - ▶ From the top menu, select **Drawing > Drawing Tools > Close Gap**.
  - ▶ Press Alt + C.
2. In the Tool Properties view, select the Auto-Flatten  button if you want the stroke you draw to be flattened in your drawing instead being on top.
3. You can display invisible lines by selecting **View > Show > Show Strokes** or press K. If you do not display the strokes, a message box will appear.

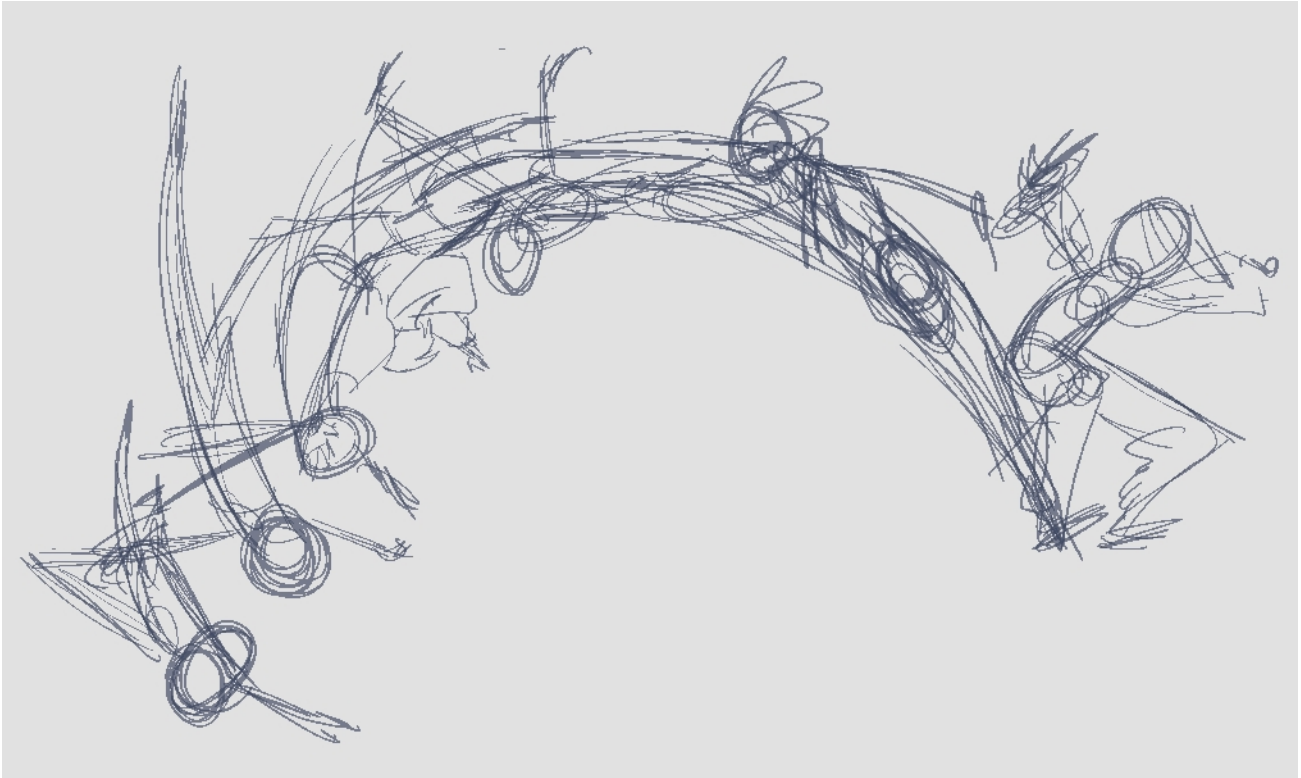


Select the **Don't Show This Message Again** option to prevent this message box from appearing again.

4. In the Camera or Drawing view, trace an invisible line near to the gap to be closed.  
The gap automatically closes.




## Chapter 5: How to Create a Traditional Animation

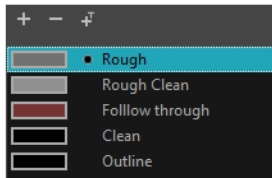


The first step to complete a traditional paperless animation is the rough construction, which is the skeleton of your animation. You would usually start with the main action. For example, to animate a walk cycle, you will start with the torso motion and the legs. Head, arms and clothes will be added later during the secondary animation.

For a satisfactory animation, complete the main action before adding all the details. If you start animating all the details right away, you will lose a lot of time if you have to make corrections. Your animation will often look too rigid.


### How to animate

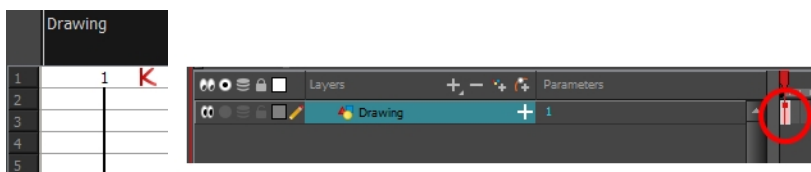
1. Press **Ctrl + U** (Windows/Linux) or **⌘ + U** (Mac OS X) to open the Preferences dialog box.
2. Select the **Exposure Sheet** tab.
3. Select the **Use Current Frame as Drawing Name** option. When this preference is enabled, drawings will be named like the frame they are created on (frame number).
4. In the Tools toolbar, select the Brush  tool or press **Alt + B**.
5. In the Colour view, select a colour for the brush. It is a good idea to choose a light colour for your rough animation. This will help you in the task that follows, the clean up process.




6. In the Timeline or Xsheet view, select the cell where the first drawing will appear.
7. In the Camera or Drawing view, draw the first key drawing.







8. With your first cell still selected, do one of the following to mark your drawing as a key drawing. This will help you stay organized.
  - ▶ In the Mark Drawing toolbar, click the Mark Selected Drawings as Key  button.
  - ▶ In the Xsheet view, select **Drawings > Mark Drawing As > Key Drawing**.
  - ▶ In the Timeline view, select **Drawings > Mark Drawing As > Key Drawing**.



9. In the Tools toolbar, click the Onion Skin  button. The Onion Skin feature displays your previous and next drawings as visual references to help you draw your new pose.
10. In the Timeline view, click and drag the blue onion skin markers to extend the number of previous and next visible drawings.
11. In the Camera View or Drawing View toolbar, press either the Onion Skin Reduce One Next/Previous Drawing or Onion Skin Add One Next/Previous Drawing to reduce or increase the number of previous



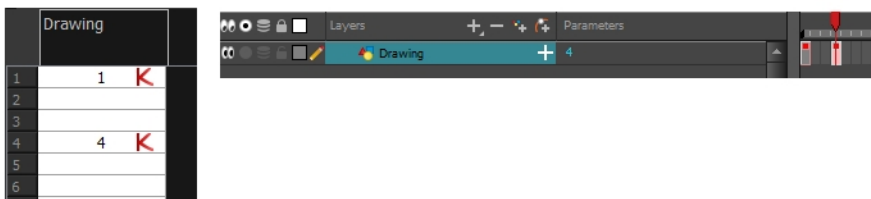
and next visible drawings. The red icons   are for the previous drawings and the green icons   are for the next drawings.



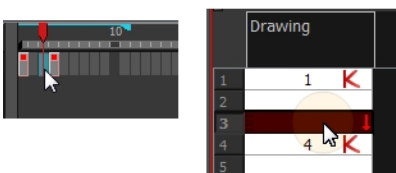
12. In the Timeline or Xsheet view, select the cell where your next key drawing will appear.
13. In the Camera or Drawing view, draw your second key drawing.




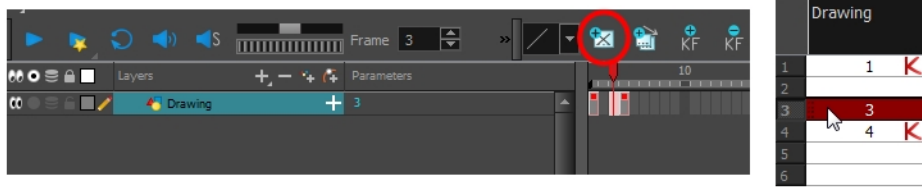
14. In the Xsheet or Timeline view, identify the drawing as a key drawing.



15. In the Timeline or Xsheet view, select a cell between the two key drawings.



16. From the Timeline toolbar, click Create Empty Drawing  to create an empty drawing or press Alt + Shift + R.
  - ▶ In the Xsheet view, right-click and select **Drawings > Create Empty Drawing** or press Alt + Shift + R.

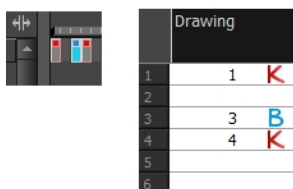


**NOTE:** Instead of creating an empty drawing, you can simply start drawing.

17. In the Camera or Drawing view, draw your new pose.





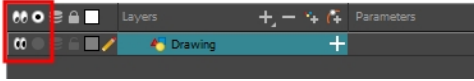
18. If necessary, in the Xsheet or Timeline view, identify the new drawing as a key, breakdown or in-between drawing using the Mark Drawing toolbar.



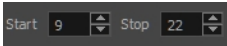
19. Use the Flip and Easy Flipping toolbars to review your animation.



20. In the Timeline or Xsheet view, select a new cell and repeat the previous steps for each new drawing.

21. In the Timeline view, use the Enable/Disable All  and Solo  buttons to turn off any layers you don't want to see during playback.



22. To loop playback, move the red playhead to the desired start frame and click the **Start** button on the Timeline toolbar. Move the playhead to the last frame of the playback and click the **Stop** button.



23. In the Playback toolbar, click the Loop  button to start the playback.
24. In the Playback toolbar, click the Play  button to start the animation.

## Cleaning Up



When your rough animation is completed, it is time to clean it up and ink it. This step is also called *tracing*. It consists of tracing solid and clean lines over the rough animation to close any open zones. This is the final paperless animation step before the ink and paint step.

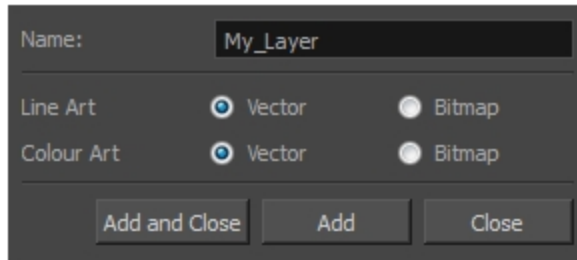
You will need to add a new drawing layer to draw your clean. This is the equivalent of adding a sheet of paper and tracing the rough using the animation disk. This method allows you to keep the roughs and the cleans intact. You only need to disable the rough layer to prevent it from appearing in the scene.

If you plan on tracing your animation in the Drawing view, you can turn on the light table to display all the layers in your project.


### How to trace your animation in a new layer

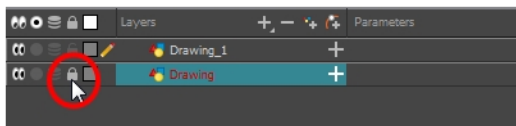
1. In the Timeline view, click the Add Drawing Layer  button or press Ctrl + R (Windows/Linux) or ⌘ + R (Mac OS X).


The Add Drawing Layer window opens.




2. In the Name field, name your new layer.
3. Set the Line Art and Colour Art options to **Vector** to get a vector layer or to **Bitmap** to have a bitmap layer.
4. Do one of the following:
  - Click **Add** to add a first layer and keep the window open to add more layers.
  - Click **Add and Close** to add a new layer and close the window.
 A new drawing layer is added to the Timeline view.

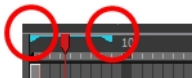
5. In the Timeline view, click the Lock  icon of the layer containing your rough animation to prevent the layer from being selected in the Camera view.



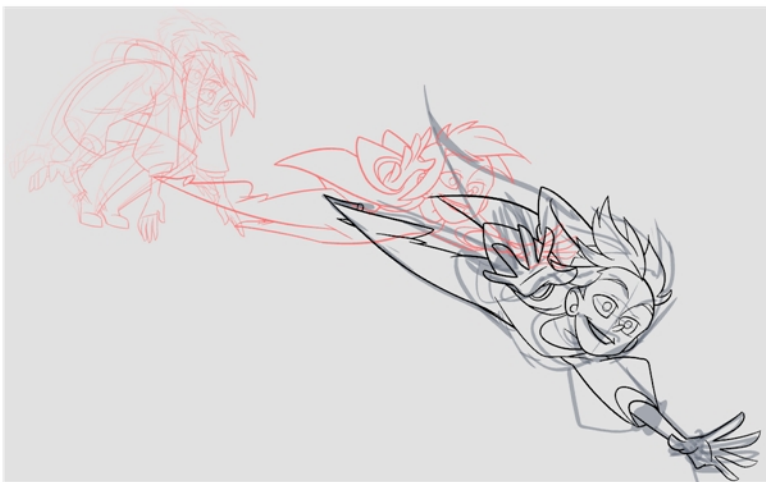
6. In the Timeline or Xsheet view, select the new layer's cell corresponding to the first key drawing of your rough animation.
7. In the Tools toolbar, select a drawing tool such as the Pencil  tool.
8. In the Colour view, select a colour for tracing your animation. Pick a dark bold colour, such as black, to make sure it contrasts well with the light colour of your rough animation.
9. In the Camera or Drawing view, start tracing the first key drawing.



10. If you have other layers in the way, you can disable them temporarily in the Timeline view, so that only your rough animation and your clean up layer are displayed in the Camera view.
11. In the Tools toolbar, click the Enable Onion Skin  button.
12. If you are not using the Onion Skinning by Drawing option, extend the Onion Skin range in the Timeline view, otherwise use the Onion Skin Add One Previous Drawing and Onion Skin Add One Next Drawing buttons in the Camera or Drawing View toolbar to add drawings to your onion skin display.



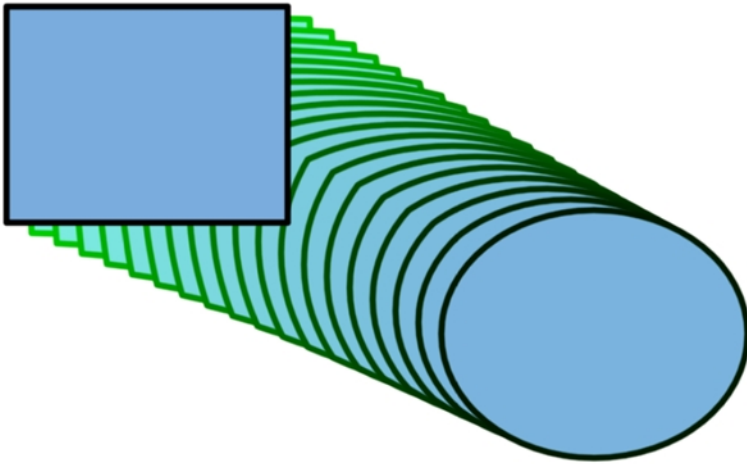
13. In the Timeline or Xsheet view, select the next cell corresponding to a rough drawing.
14. In the Camera view, trace your next drawing.



15. Repeat the previous steps for each drawing.




## Chapter 6: How to Morph Drawings

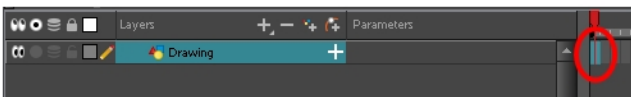



When it comes to morphing, you will need to practice and become at ease with it. Once you are familiar with the basic rules, you can start creating morphing sequences. To begin, start with simple elements. When you are confident with the morphing process, you can start to use complex and advanced morphing techniques, such as head rotations or full characters.

You may want to delete an entire morphing sequence in order to redo a sequence from scratch.

### How to create a basic morph

1. In the Timeline toolbar, click the Add Drawing Layer  button to add a new layer to your project.
2. Rename the new layer ( for example, **Morphing**).
3. In the Timeline or Xsheet view, select the first cell in the layer.




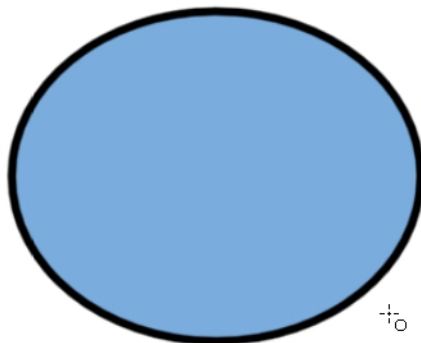
4. Do one of the following:
  - ▶ In the Tools toolbar, select the Rectangle  tool.
  - ▶ Press Alt + 7.
5. In the Camera or Drawing view, draw a rectangle.
6. Do one or both of the following:
  - ▶ Hold down the Shift key to draw a square.
  - ▶ Hold down the Alt key to draw the rectangle from its centre.
7. Paint your rectangle using the Paint tool.



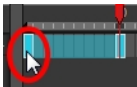
8. In the Xsheet or Timeline view, select the cell on which you want your morphing sequence to end.



9. Do one of the following:
  - ▶ In the Tools toolbar, select the Ellipse  tool.
  - ▶ Press Alt + =.
10. Draw and paint the ellipse using the same outline colour as the rectangle.



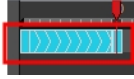
11. In the Xsheet or Timeline view, select the first frame and all the frames up to and including the last frame, which is the rectangle drawing.



12. Do one of the following:
  - ▶ From the top menu, select **Animation > Morphing > Create Morphing**.
  - ▶ In the Xsheet or Timeline view, right-click and select **Morphing > Create Morphing**
  - ▶ Press Alt + M.

Arrows appear between the two key drawings to show that computer generated inbetweens have been created.





**NOTE:** Use the Playback toolbar to play the morphing sequence. To flip through the inbetweens, toggle between comma (,) and period (.). Press F4 to toggle between the two key drawings.

### How to delete an entire morphing sequence

1. In the Xsheet or Timeline view, select a cell in the morphing sequence.
2. Do one of the following:
  - ▶ From the top menu, select **Animation > Morphing > Delete Morphing**.
  - ▶ In the Xsheet or Timeline view, select **Morphing > Delete Morphing**.
  - ▶ Right-click on your sequence and select **Morphing > Delete Morphing**.

The entire sequence between the two keyframes is removed.




## Chapter 7: How to Import Bitmap Images

A **bitmap image**<sup>1</sup> is an image composed of pixels that are both size and resolution dependent. In Harmony, you can import bitmap images and vectorize them, making the images editable. Then you can use a variety of drawing tools to edit the image. Or you can always keep the original bitmap image as is.

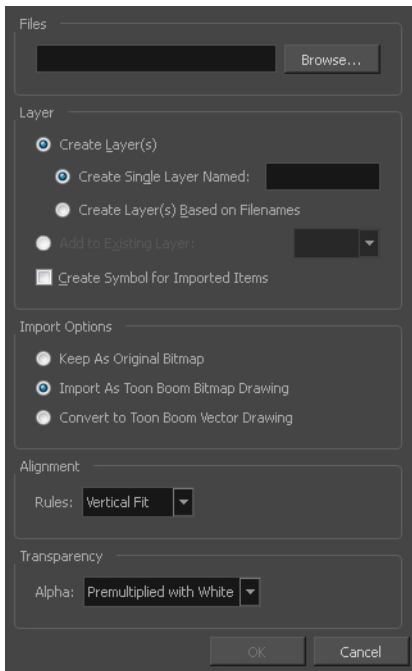
Also, you can choose to import bitmap images on bitmap or vector layers depending on your project.

**NOTE:** You can drag and drop a bitmap image directly from the Library into the scene (Camera) as a quick way of importing a bitmap image. However, you will not have access to all the import options.

### How to open the Import Images dialog box

- Do one of the following:
  - From the top menu, select **File > Import > Images**.
  - In the File toolbar, click the Import Images  button.
  - In the Xsheet view, right-click anywhere in the frame area and select **Import > Images**.

The Import Images dialog box opens.



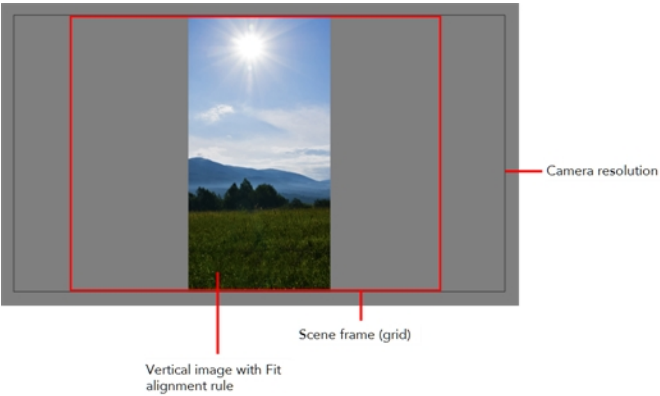
### How to import a bitmap image in its original format


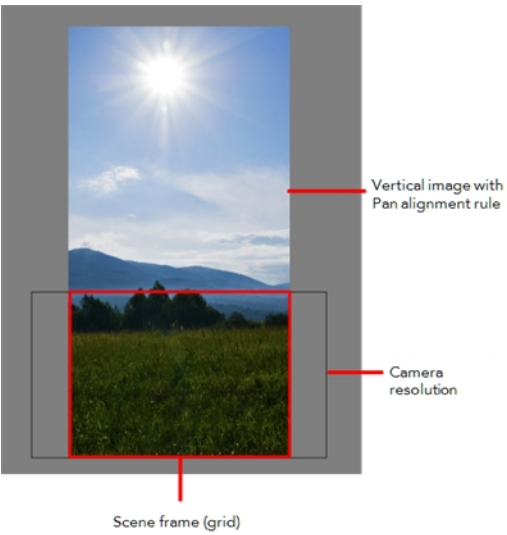
- In the Files section of the Import Images dialog box, click **Browse** to find and select one or more images on


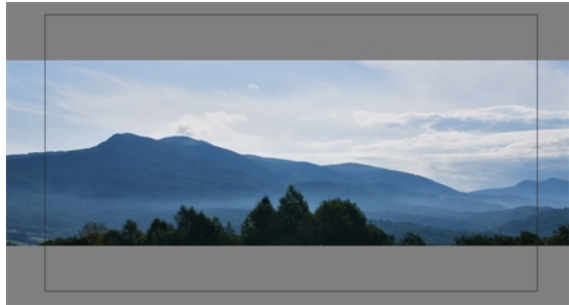
<sup>1</sup>An image composed of pixels with a single resolution (size). If it is enlarged too much, it will lose definition and pixels will begin to appear. This is known as pixelation.

your computer.

2. Decide if the bitmap image will go on a new layer or an existing layer. To add the bitmap image to a new layer, go to step 3. To add the bitmap image to an existing layer, go to step 4.
3. Add the bitmap image to a new layer by selecting the **Create Layer(s)** option and one of the following options and then proceed to step 5:
  - **Create Single Layer Named:** Creates a layer you can name.
  - **Create Layer(s) Based on Filenames:** Creates a layer based on each unique filename prefix. For example, the filenames a-1.tga, a-2.tga and b-1.tga will create layers name "a" and "b", where "a" has two drawings and "b" has one. When creating a single layer from these three filenames, all three drawings will be inserted in the new layers.
4. Select the **Add to Existing Layer** option to place the bitmap image on a layer you select from the list. If only vector layers are available in your scene, they will not be displayed in the list. You can choose to encapsulate the bitmap in a symbol by selecting the **Create Symbols for Imported Items** option.
5. In the Import Options section, select the **Keep As Original Bitmap** option. In the Alignment section, decide on the size and placement of your image within the camera frame. Depending on the Scene Settings (the height and width in pixels that you chose for your project), an image that you import may be scaled to the point where all its individual pixels become visible. There are three options available in the Alignment section:

| Parameter | Description  |
|-----------|--|
| Fit       | <p>Enlarges or shrinks (but not distorts) the image height to match the full height of the scene grid.</p>  <p>If the image orientation is landscape, this will enlarge or shrink (but not distort) the image width to match that of the scene grid.</p> |

|     |   |
|-----|---|
|     |  <p>Note that the Fit alignment rule equals the Center Fit rule in the layer properties.</p>  |
| Pan | <p>This is the opposite of the Fit parameter. If the image orientation is portrait, its width will be made to match the width of the scene grid. As a result, part of the image's height will extend beyond the height of the frame. This can be useful if you want to make your background move up and down, or from left to right to make it appear as if the camera is panning or to actually perform a camera pan.</p>  <p>The opposite will apply to a landscape image. Its height will be fit to the scene grid, therefore it is possible that the image will extend beyond the scene grid's boundaries.</p> |

|                    |   |
|--------------------|---|
|                    |  <p>Scene frame      Camera resolution      Landscape image with Pan alignment rule</p> <p>Note that the Pan alignment rule equals the Center First Page rule in the layer properties.</p>  |
| Project Resolution | <p>Scales the image in proportion to the scene's resolution. The system looks at the resolution of the bitmap image, for example 4000 x 2000, then compares it to the scene's resolution, for example 1920 x 1080, and adjusts the scale factor in proportion. So, in this example, the bitmap would appear at 208% (4000/1920). If you import a bitmap that is 960 x 540, it will be displayed at 50% (960/1920) of the size of the project resolution.</p>  <p>Note that the Project Resolution alignment rule is equal to the As Is rule in the layer properties.</p> |


6. In the Transparency section, select one of the following from the Alpha menu:

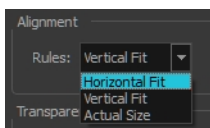
| Parameter                | Description   |
|--------------------------|---|
| Premultiplied with White | Individual pixels at the edge of an image are blended with white.   |
| Premultiplied with Black | Semitransparent pixels in the original image are blended with black.  |
| Straight                 | Pixels at the edge of an image are blended with black, white and greys.   |
| Clamp Colour to Alpha    | Premultiplies the colour value with the alpha value. When the colour is clamped to the alpha, the colour value cannot be higher than the alpha value. It calculates the real colour value faster. When the RGB values are multiplied with the alpha value, that is, if you have a pixel of value R=247, G=188, B=29 and the alpha is 50% or the image has a 50% transparency, then the actual RGB values that are output would be half of the |

|  |                       |
|--|-----------------------|
|  | amounts listed above. |
|--|-----------------------|

1. Click **OK**.

### How to import a bitmap image as a Toon Boom bitmap drawing



1. In the Files section of the Import Images dialog box, click **Browse** to find and select one or more images on your computer.
2. In the Import Options section, select the **Import as Toon Boom Bitmap Drawing** option.
3. Decide if the bitmap image will go on a new layer or an existing layer. To add the bitmap image to a new layer, go to step 4. To add the bitmap image to an existing layer, go to step 5.
4. In the Layer section, select the **Create Layer** option, and one of the following options to add the bitmap image to a new layer:
  - **Create Single Layer Named:** Creates a layer you can name.
  - **Create Layer(s) Based on Filenames:** Creates a layer based on each unique filename prefix. For example, the filenames a-1.tga, a-2.tga and b-1.tga will create layers name "a" and "b", where "a" has two drawings and "b" has one. When creating a single layer from these three filenames, all three drawings will be inserted in the new layers.
5. Select the **Add to Existing Layer** option to place the bitmap image on a layer you select from the list. If only vector  layers are available in your scene, they will not be displayed in the list. You can choose to encapsulate the bitmap in a symbol by selecting the **Create Symbols for Imported Items** option.
6. In the Alignment section, decide on the size and placement of your image within the camera frame. Depending on the scene settings (the height and width, in pixels, that you chose for your project), an image that you import may be scaled to the point where all its individual pixels become visible.



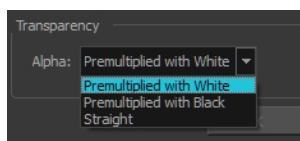
**NOTE:** Make sure you are in the Camera view's Render Mode when judging an imported image, otherwise it may appear blurry. You can also adjust the quality of a bitmap image displayed in the OpenGL mode by using **View > Bitmap File Quality**. You must select your bitmap image using the Transform tool.

The following three Alignment Rules options are available:

| Parameter    | Description  |
|--------------|--|
| Vertical Fit | Enlarges or shrinks (but not distort) to your image height to match the full height of the scene frame (alignment grid). |

|                       |  |
|-----------------------|--|
|                       |    |
| <p>Horizontal Fit</p> | <p>Enlarges or shrinks (but not distort) to your image height to match the full width of the scene frame (alignment grid).</p>    |
| <p>Actual Size</p>    | <p>Scales the image in proportion to the scene's resolution. The system looks at the resolution of the bitmap image, for example 4000 x 2000, then compares it to the scene's resolution, for example 1920 x 1080, and adjusts the scale factor in proportion. So, in this example, the bitmap would appear at 208% (4000/1920). If you import a bitmap that is 960 x 540, it will be displayed at 50% (960/1920) of the size of the project resolution.</p> |

7. In the Transparency section, decide how the bitmap image will be antialiased, more specifically, the way the pixels along the edge are blended in the RGBA (red, green, blue, alpha (transparent)) channels. Your bitmap image will exist in the bitmap layer of the newly created drawing element.




| Parameter | Description |
|-----------|-------------|
|-----------|-------------|

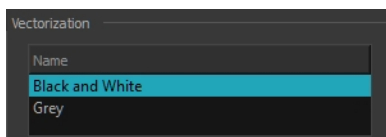


|                          |   |
|--------------------------|---|
| Premultiplied with White | Individual pixels at the edge of an image are blended with white.       |
| Premultiplied with Black | Pixels at the edge of an image are blended with black.                  |
| Straight                 | Pixels at the edge of an image are blended with black, white and greys. |

8. Click **OK**.

### How to import a bitmap image and convert it to a Toon Boom vector drawing

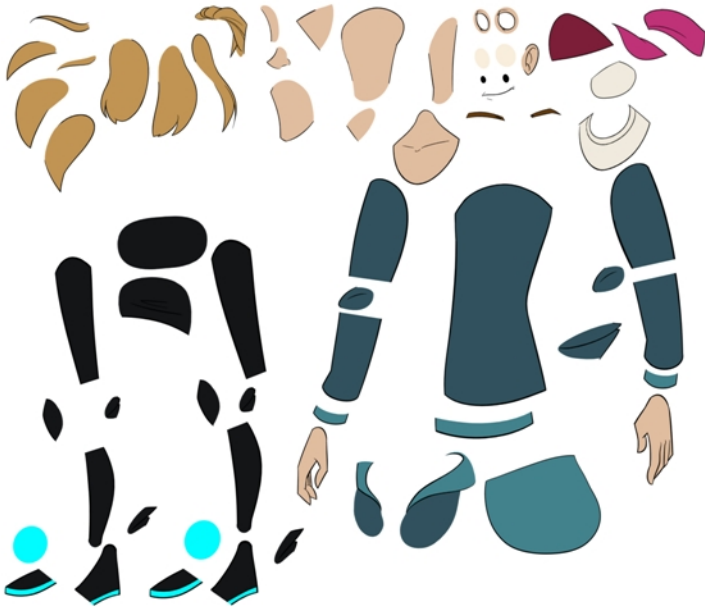
1. In the Files section of the Import Images dialog box, click **Browse** to select one or more images on your computer.
2. In the Import Options section, select the **Convert to Toon Boom Vector Drawing** option.
3. Decide if the bitmap image will go on a new layer or an existing layer. To add the bitmap image to a new layer, go to step 4. To add the bitmap image to an existing layer, go to step 5.
4. In the Layer section, select the **Create Layer** option, and one of the following options to add the bitmap image to a new layer:
  - **Create Single Layer Named:** Creates a layer you can name.
  - **Create Layer(s) Based on Filenames:** Creates a layer based on each unique filename prefix. For example, the filenames a-1.tga, a-2.tga and b-1.tga will create layers name "a" and "b", where "a" has two drawings and "b" has one. When creating a single layer from these three filenames, all three drawings will be inserted in the new layers.
5. Select the **Add Existing Layer** option to place the bitmap image on a layer you select from the list. If only vector  layers are available in your scene, they will not be displayed in the list. You can choose to encapsulate the bitmap in a symbol by selecting the **Create Symbols for Imported Items** option.
6. In the Vectorization section, decide whether you want to import your image in black and white or grey.



| Parameter       | Description  |
|-----------------|--|
| Black and White | Vectorizes drawings as a solid black line; creates a 100% vector-based drawing.  |
| Grey            | Vectorizes your image as a mix of vector contour and greyscale bitmap filling. Lines keep the texture from the scan, and the white of the paper becomes transparent. |



## Chapter 8: How to Build a Cut-out Character



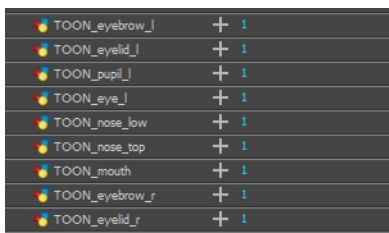
There are many techniques you can use to break down a puppet. In this section, you will learn about one of the most common and simplest methods. For your first character **breakdown**<sup>1</sup>, follow these instructions to get an idea of the way Harmony works. Once you understand Harmony's basic functions and commands, you will be able to create your own techniques to satisfy the needs of your production.

### Drawing the Pieces

The main breakdown technique shown here is to trace your model.

#### How to break down a character


1. In the Timeline view, add a new drawing layer for each body part to separate. You can press Ctrl + R (Windows/Linux) or ⌘ + R (Mac OS X).

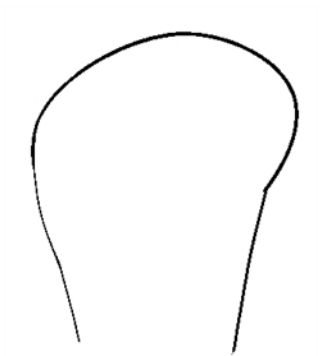



<sup>1</sup>In cut-out animation, the breakdown is the action of breaking a character into pieces to create a puppet with articulations. To breakdown a character, the artist will cut parts, such as hands and arms, from the character's model and paste them in separate layers. Next, the joints will be fixed and the pivots set. In additional animation, a breakdown is an animation pose generally found between two key poses. The key poses are the main poses in an animation and the breakdowns are secondary poses, ones that help to describe the motion and the rotation curve.

- In the Timeline view, select the layer's first cell in which you want to draw the part.

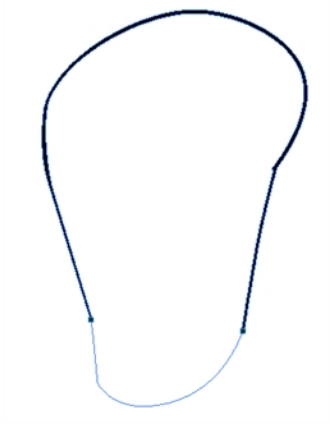




- In the Tools toolbar, select a drawing tool.
- In the Colour view, select a colour swatch. If you haven't created a palette for your character yet, see [How to Paint](#) on page 15.
- In the Camera or Drawing view, draw the new part with as with as few points as possible so the pieces are easy to manipulation, modify or redraw. Using the Polyline  tool would make it easy to do this.



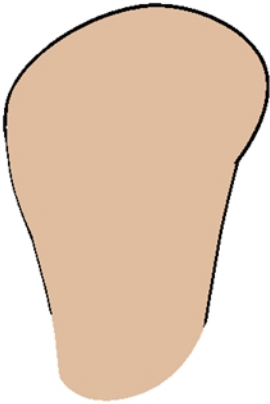
If you are working in the Drawing view, click the Light Table  button in the Drawing View toolbar to display the other layers as washed out colours. You can also press Shift + L.




- You can use the Stroke tool in the Tools toolbar to create an invisible hairline if you want to close a shape without drawing an actual stroke.
  - Select **View > Show > Show Strokes** or press K to display the invisible lines.

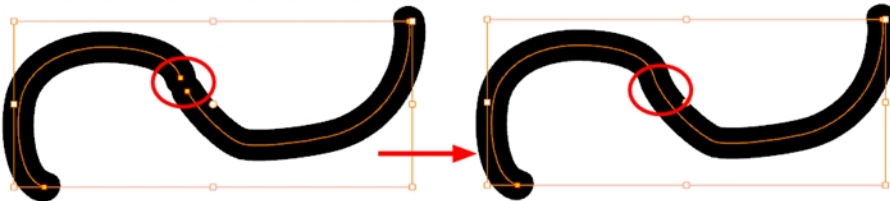


- In the Tools toolbar, select the Paint  or Paint Unpainted  tool to colour your drawing.
- In the Colour view, select the corresponding colour.

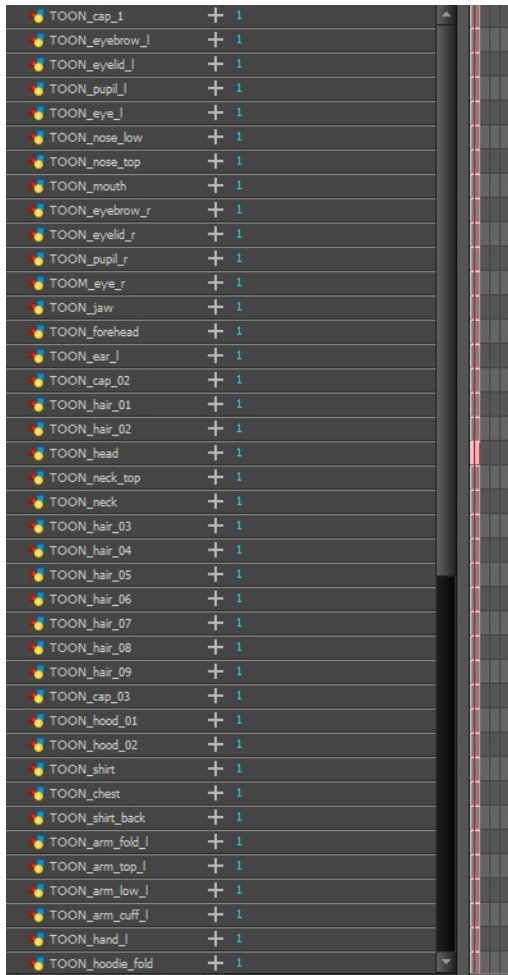
- In the Camera or Drawing view, paint your drawing.



- In the Tools toolbar, select the Select  tool. Select your drawing and flatten the lines by clicking the Flatten  button in the Tool Properties view.
- If your lines are composed of several pencil strokes, you might want to combine them into one single smooth pencil line. Using the Select tool, select the pencil lines to be merged and in the Tool Properties view, click the Merge Pencil Lines  button.



- Repeat the entire process until the break down is completed.

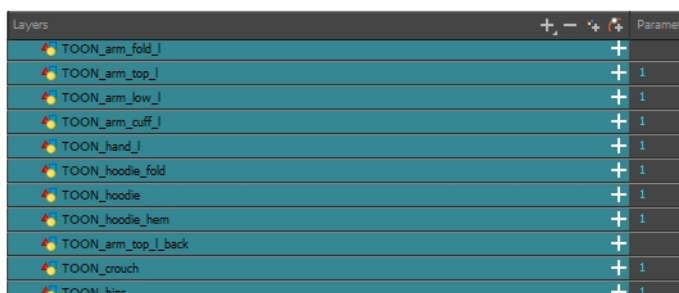



## Adding Pegs

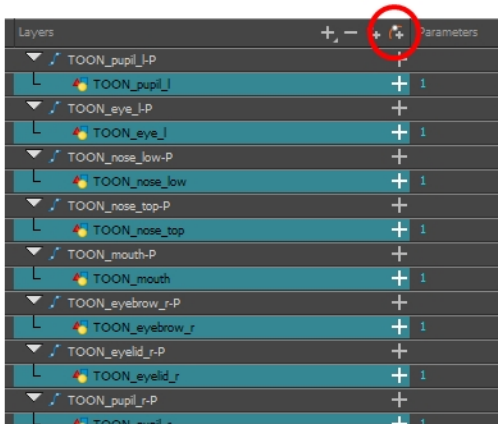
It is recommended to add parent pegs to your drawing layers which are path layers that let you add keyframes to modify the positions of pieces over time. It is not mandatory, but it is helpful to have your drawings and keyframes separated.

### How to parent drawing layers to pegs

1. In the Timeline view, select all the layers.



- In the Timeline Layer toolbar, click the Add Parent Peg  button to add a parent peg to all selected layers.

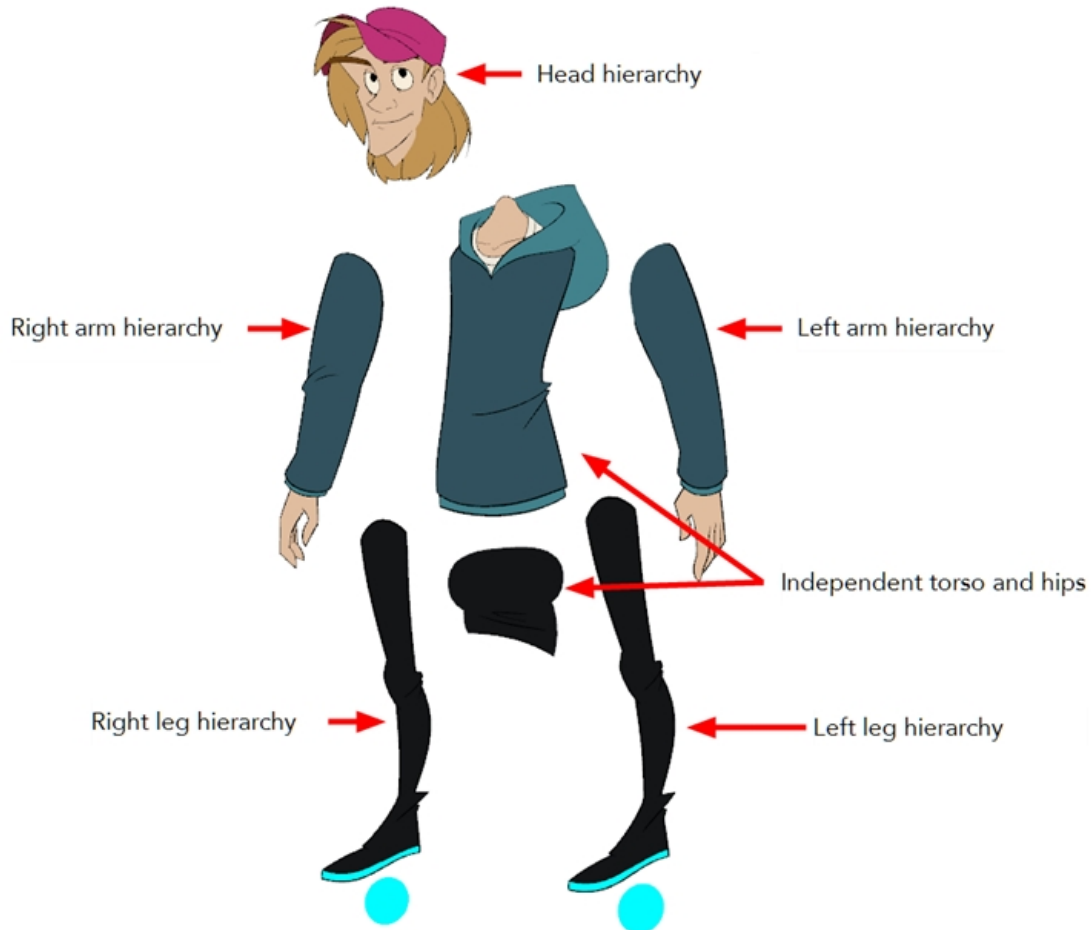


s

## Parenting Layers

Harmony lets you extend your rigging techniques beyond normal boundaries and sets new standards. You can create hierarchies without encapsulating pieces inside each other by creating a linked structure between layers.

You should create a hierarchy on the arms and legs, and keep them separated from the body. This gives you more animation freedom, and when you need to scale or skew the torso, it will not affect the entire body.



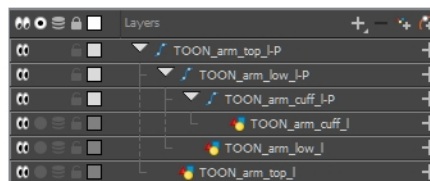
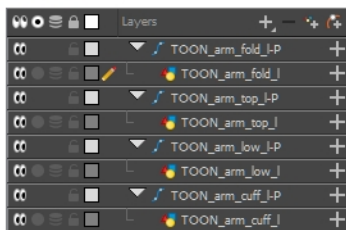
### How to create a hierarchy in the Timeline view

1. Drag the child piece (hand) and drop it ON the parent piece (forearm). Then, you can drag the parent (forearm) piece onto another parent piece (upper arm).

Without pegs



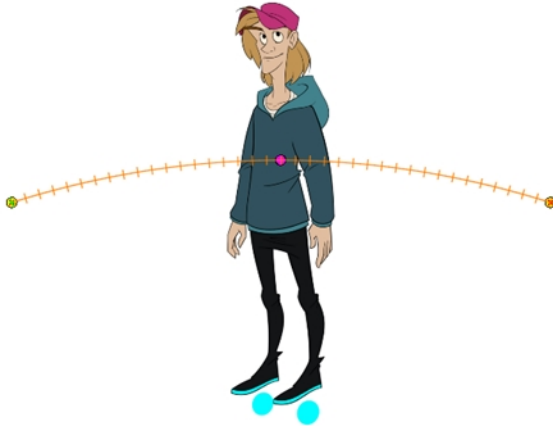
With pegs



- You can unparent layers by holding down Shift and dragging the selected parents away from the child layer. Drop your selected between other layers.




## Master Peg



When you animate your character, you will probably need to resize and reposition it to fit your scene. When you need to scale down or move your character, it is a good idea to hook (attach) the whole puppet to a trajectory.

Attaching your puppet to a **peg**<sup>1</sup> will allow you to scale it and reposition it without having to do this to the different parts and pieces. Only one layer will contain the position information, which makes your animation easier to modify and control.

### How to add a master peg

1. In the Timeline view, select the top layer to parent a peg to it. You need to select a layer to be able to add a peg to your scene.
2. In the Timeline view, click on the Add Peg  button.  
A new peg is added to the timeline as a parent of the selected layer.
1. Name the new peg **Master** plus the character's name.
3. In the Timeline view, select all the layers you want to attach to your new peg. Remember that one item is already parented to that peg.

---

<sup>1</sup>In traditional animation, a tool used to ensure accurate registration of action as cel layers move. In digital animation, in which you are doing a more advanced puppet rigging, you can use peg layers. Peg layers are trajectory layers that do not contain drawings. They are motion paths that you can use to add path articulations. For the latter, you can also use the Inverse Kinematics tool.

2. Drag your selection **ON** to the peg layer to parent all your character's pieces to the peg. If your layers are added above the already parented layers, move that parented layer back on top of the layer stack.



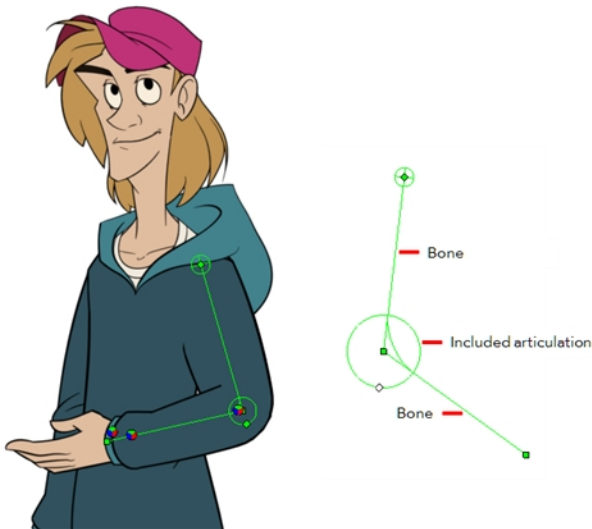
## Chapter 9: How to Use Deformers

Deformation technology allows you to deform bitmap and vector drawings over a period of time. You can link deformers to create a hierarchy of deformation. You can deform a character made out of one, or many, drawing or image layers and make it move as if it were a cut-out puppet.

### About the Deformation Effects

Deformations let you animate bitmap or vector-based graphics, including gradients and textures. Deformations act as a skeleton with limbs and articulations you can bend, reshape, and curve. You can deform a character made out of one, or many, drawing or image layers and make it move as if it were a cut-out puppet. A deformation skeleton is composed of deformation nodes, which are the various pieces (here represented as layers or nodes) required to articulate or deform your drawings, such as a series of bones or game bones—see [Deformation Nodes on page 1](#).

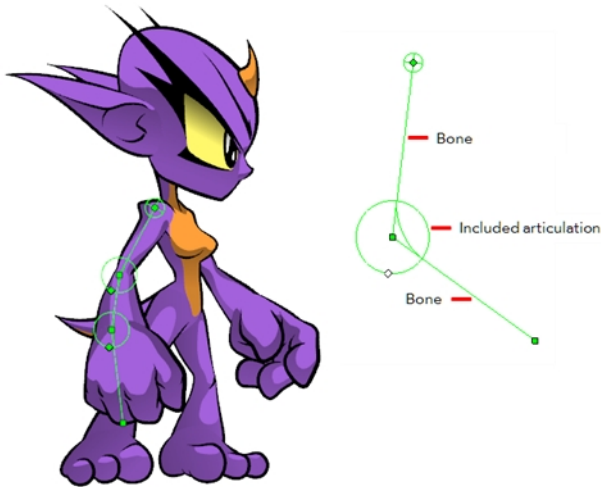
### Bone Deformer



The Bone deformation allows you to create a skeleton structure in which the parent bone moves the child bone. The Bone deformation is useful when animating the extremities of a character, such as the arms or legs, adding fluidity and a natural feel to the animation. It can be manipulated to rotate a limb at an articulation joint and to shorten or elongate the extremities of a limb. It's also quite handy for bending the torso.

**NOTE:** If you are creating a rig to be used in a game, use the Game Bone deformation.

## Game Bone Deformer



The Game Bone deformation is very similar to the Bone deformation and allows you to create a skeleton structure in which the parent bone moves the child bone. The difference is that the Game Bone deformation is optimized to export to game engines, mainly Unity.

The Game Bone deformation is mostly used when animating the extremities of a character, such as the arms or legs, adding fluidity and a natural feel to the animation. The Game Bone deformation can be manipulated to rotate a limb at an articulation joint and to shorten or elongate the extremities of a limb. It's also quite useful for bending the torso.

The main difference between the Bone and Game Bone deformations is that the Game Bone deformation doesn't have the Bias parameter. The rendered result is also different for the articulation folds. They are slightly rounded.


## Rigging

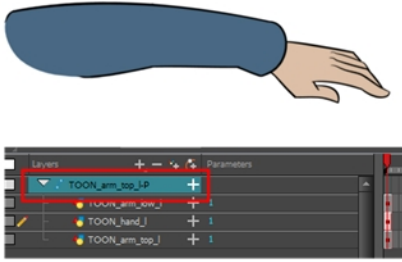
Using the Rigging tool, you can quickly create a basic deformation rig.

As you create your chains, the controls will be showing. However, whenever you close your project, the deformation controls display is turned off. When you reopen the project, you can display all controls or only some of them—see [Display the Deformer Controls on page 54](#).

The Insert menu allows you to manually add the nodes necessary to create the deformation skeleton. Additional nodes such as the Kinematic Output are available to create advanced rigs.

### How to select an element to add deformation to


1. From the Deformation toolbar, click the Rigging  tool.
2. In the Camera or Timeline view, select the element on which you want to add a deformation. When selecting a drawing node, the deformation components will be automatically added on top of the drawing node. When selecting a peg node, the deformation components will be added below the peg.

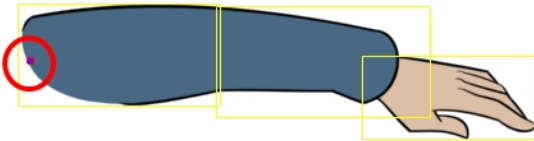


**NOTE:** Never place a deformation node above a peg node. Having a peg below a deformation node (Bone, Game Bone, etc.) will cause unexpected result. The animation on the peg will move the image out of the defined deformation zone. The same applies to animations created on the drawing layer itself. A drawing layer has an embedded peg.

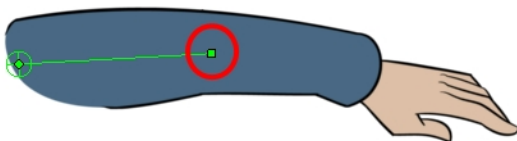
3. In the Camera view, create your rig. See the following procedures to learn how to add a specific deformation type.

#### How to add a Bone or Game Bone deformation chain

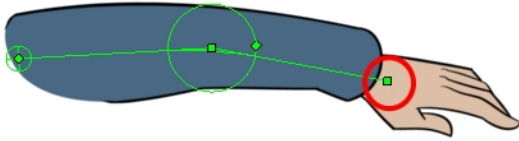
1. Once your element and the Rigging tool selected, in the Tool Properties view, enable the Bone  mode or the Game Bone mode depending on your purpose—see [Main Types of Deformations](#).
2. Place the cursor at the root of your drawing or group of drawings, click once and release. For example, on the shoulder.



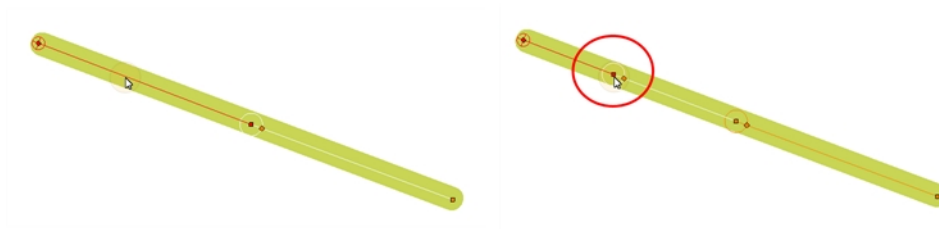
3. Click again at the location where you want your first bone to finish and your second bone to start. An articulation control point will automatically be inserted between each bone you create. Note that the articulation parameters are part of the Bone and Game Bone nodes since Harmony 12.



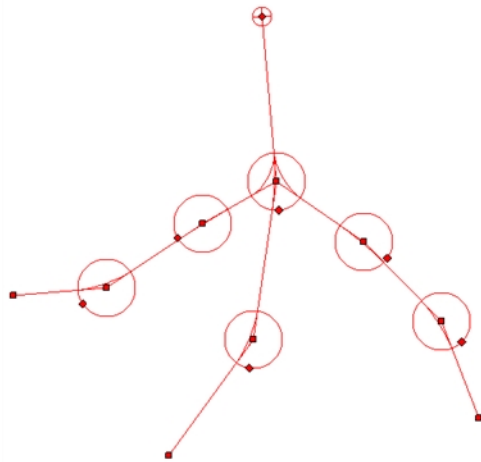
4. Repeat this until you are finished creating the Bone chain.



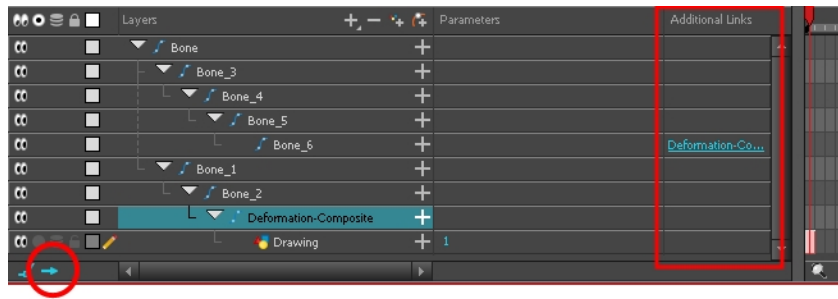
5. If you need to insert a bone between existing ones, hold down the Alt key. When the Insert Bone cursor is displayed, click on the existing bone segment at the location where you want to add an additional bone.




- Note that you can click on any Bone articulation point to start a new bone chain from that point. Once the articulation point is selected (white), click on the location where you want to add a bone and a new bone chain will be created, parented to the previous one.



- When you have several chains controlling the same drawing or group of drawings, a Deformation Composite node is automatically be created and appears in the Timeline view. In the Additional Links section of the Timeline view, you can see which nodes are connected to the Deformation Composite.



6. With the deformation nodes still selected, in the Deformation toolbar, click the Reset Current Keyframe  button. This will set the current resting position as the current frame one.



### How to add a deformation node

1. In the top menu, select **Insert > desired deformation node**.

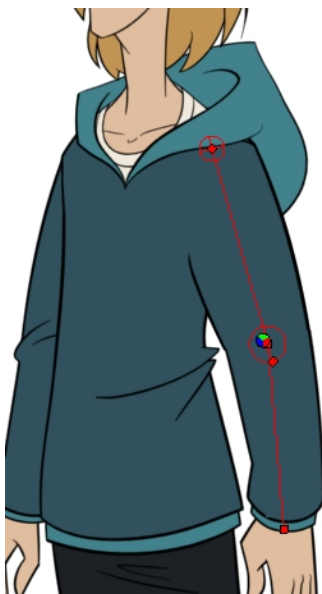
## Adjusting the Deformation Chain

Once you have a deformation chain created, you can optimize its positioning to fit the element it will deform.

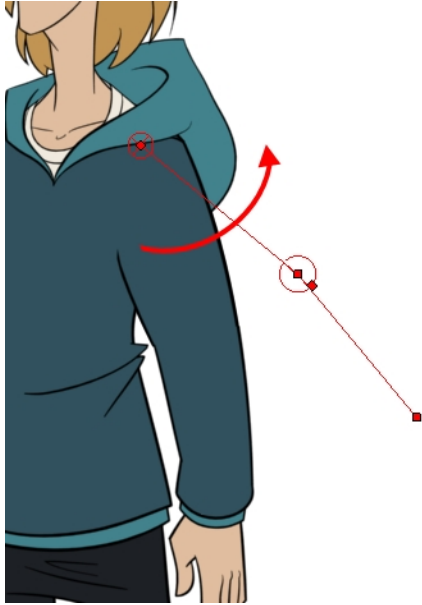
### How to set up Bone and Game Bone deformation chains

1. In the Timeline view, select the deformation nodes you want to set.
2. In the Deformation toolbar, click the Show Selected Deformers and Hide All Others  button to display the deformer controls in the Camera view. This also hides all the deformer controls that were displayed.
3. In the Deformation toolbar, click the Rigging  tool.

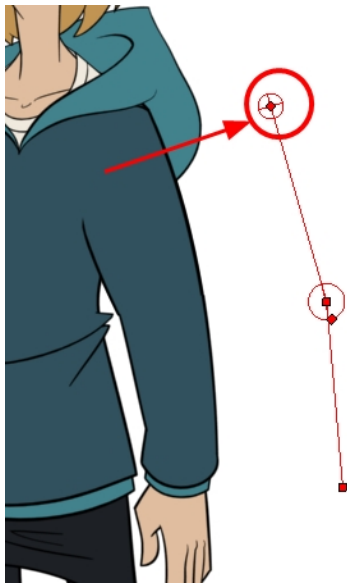
The chain turns from green to red. A green chain indicates the puppet is in animation mode. A red chain indicates the puppet is in a resting position. Make sure your chain is red.



4. In the Camera view, set up the deformation chain.
  - Rotate the first bone to change the angle of the chain.

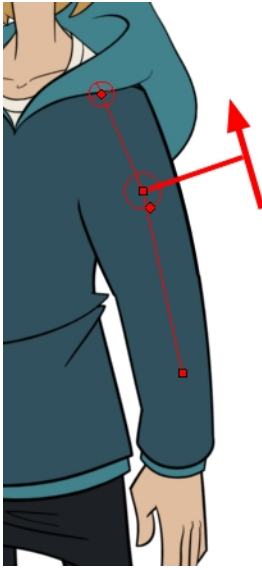


- Use the root control to reposition (offset) the entire chain.

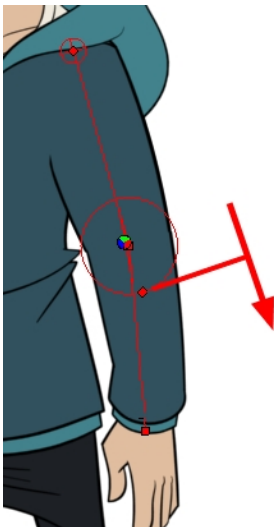




- Use the control points to reposition the articulations. This will elongate, shorten or change the direction of the bone and offset the subsequent children.

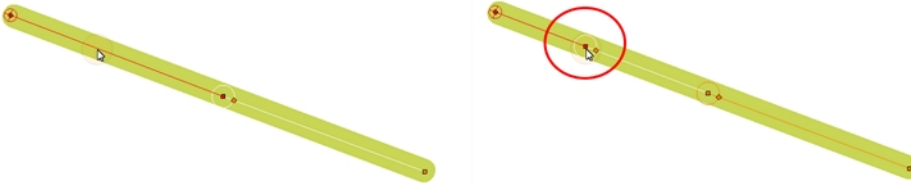




- ▶ Use the articulation's control (square) to change the size of the articulation. For quality purposes, it is recommended to have an articulation which fits the diameter of the part it controls.



5. Repeat until all the articulations and bones of the chain are correctly aligned to the element to which it is linked. You can also set additional parameters in the Layer Properties window.
6. With the deformation nodes still selected, in the Deformation toolbar, click the Reset Current Keyframe  button. This will set the current resting position as the current frame one.
7. Use the Transform  tool. For optimal results, make sure the size of the articulation is approximately the same size as the drawing.
8. If you need to insert a bone between existing ones, hold down the Alt key. When the Insert Bone cursor is displayed, click on the existing bone segment at the location where you want to add an additional bone.




## Display the Deformer Controls


Before you can manipulate the deformer outside of the Rigging mode, you must display the deformation controls.

If you just created the deformation rig, the controls will still be showing. However, when you close your project, the deformers are turned off. When reopening a project, you must display the controls so you can see the ones you need while animating.

### How to display the selected deformation controls

1. In the Camera, Timeline view, select the drawing layer or deformation nodes you want to display.
2. Do one of the following:
  - In the Camera toolbar, click the Show Control  button.
  - From the top menu, select **View > Show > Control**.
  - Press Shift + F11.


### How to display the selected deformation controls and hide all the others

1. In the Camera, Timeline view, select the drawing layer or deformation nodes you want to display.
2. In the Deformation toolbar, click the Show Selected Deformers and Hide All Others  button.  
The selected deformation controls appear in the Camera view and all the others are hidden.

### How to display all the deformer controls at the same time

1. In the Timeline view, select **Edit > Select All** from the top menu to select all the nodes or press Ctrl + A (Windows/Linux) or ⌘ + A (Mac OS X).
2. In the Camera toolbar, click the **Show Control**  button or press Shift + F11.  
All deformation controls in scene are displayed.

### How to hide the deformer controls




1. Do one of the following:
  - In the Camera toolbar, click the Hide All Controls  button.
  - From the top menu, select **View > Hide All Controls**.

- Press Shift + C.


## Animation

The controls to animate deformations work the same as those for setting up the chains. You simply need to create keyframes and position the control points.

### How to animate Bone and Game Bone deformations

1. In the Timeline view, go the frame on which you want to create the first animation pose.
2. In the Tools toolbar, select the Transform  tool.
3. If you want to create animation keyframes, enable the Animate  mode in the Tools toolbar.
4. Do one of the following:
  - In the Timeline toolbar, click the Add Keyframe  button.
  - Right-click and select **Add Keyframe**.
  - Press F6.

A keyframe is added on the current frame.

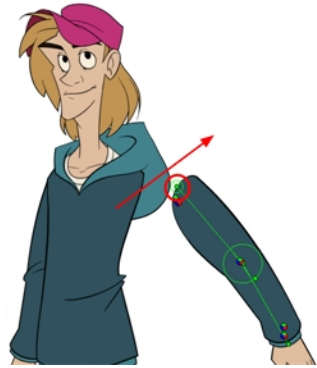
5. In the Timeline view, select the deformation nodes you want to animate—see [Display the Deformer Controls on page 54](#).
6. In the Deformation toolbar, click the Show Selected Deformers and Hide All Others  button to display the deformer of the selected piece.
7. In the Camera view, do the following:
  - Rotate the first bone to rotate the limb.



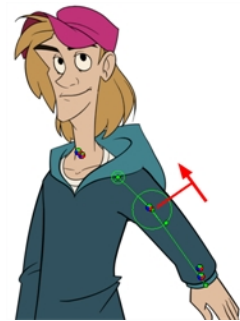
- Rotate the subsequent bones to bend the limb.



- Use the root control to reposition (offset) the entire chain.




- Use the control points to reposition the articulations. This will elongate, shorten, or change the direction of the bone and offset the subsequent children.

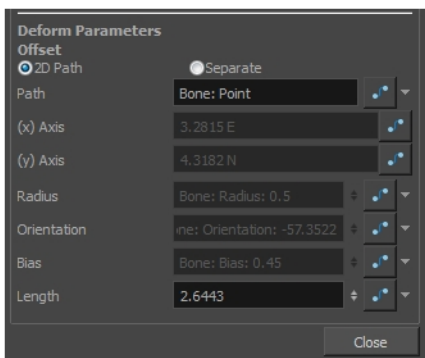


- Use the articulation's control (square) to change the size of the articulation. For quality purposes, it is recommended to have an articulation which fits the diameter of the part it controls.

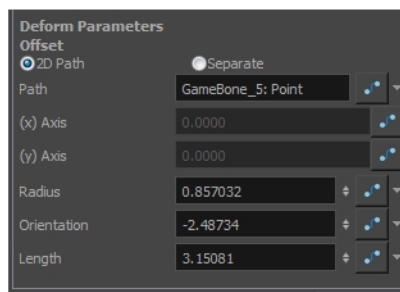


8. In the Timeline view, go the frame on which you want to set the next key pose. You will need to expend the exposure to see your drawings further down the Timeline view.
9. Add a keyframe on the current frame by doing one of the following:
  - In the Timeline toolbar, click the Add Keyframe  button.
  - Right-click and select **Add Keyframe**.
  - Press F6.
10. Repeat the previous steps to animate your character.

You can also manipulate the deformer by typing values directly in the Layer Properties of the deformation effect nodes.



Bone layer properties



Game Bone layer properties (no Bias)





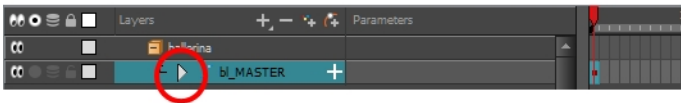
# Chapter 10: How to Animate a Cut-out Character



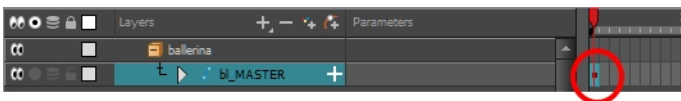
Harmony provides some great tools for animating puppets. You can create simple animation using the Transform tool, as well as create advanced animation using both forward and inverse kinematics. Harmony has advanced onion skinning and image swapping features to help you animate efficiently and quickly. For animation freedom, you have the ability to mix several different techniques of animation, such as simple rigging, hierarchy and symbol animation.

## How to create a simple cut-out animation

1. In the Tools toolbar, select the Transform  tool or press Shift + T.
2. In the Tools toolbar, enable the Animate  mode so everything you move will be keyframed automatically.
3. From the top menu, select **Animation > Stop-Motion Keyframe** so the interpolation is not created automatically between keyframes.
4. In the Timeline view, collapse your character.




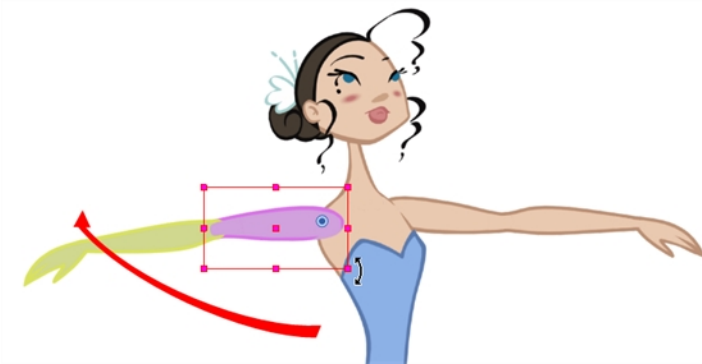
5. In the Timeline view, go to the frame where you want to set the first pose.



6. To ensure that nothing moves on the new pose, in the Timeline view, select the frame corresponding to the pose, right-click and select **Add Keyframe** or press F6.
7. In the Camera view, select the parts to animate.

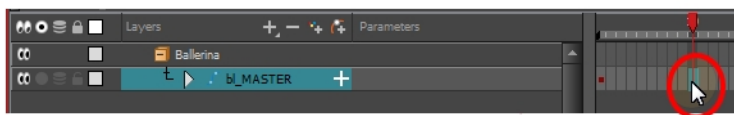


- Use the Transform  tool to rotate, skew, scale or translate the selection to its new position. To rotate the piece, place your cursor slightly outside of a corner until you see the rotation cursor.



A new keyframe appears in the Timeline view if you did not create one previously. Always create your keyframe first.

- In the Tools toolbar, enable the Onion Skin  feature.
- In the Timeline view, go to the frame where you want to set the second keyframe. You will need to extend the exposure to see your drawings further down the Timeline view.





- To ensure that nothing moves on the new pose, in the Timeline view, select the frame corresponding to the pose, right-click and select **Add Keyframe** or press F6.
- In the Camera view, animate your character.





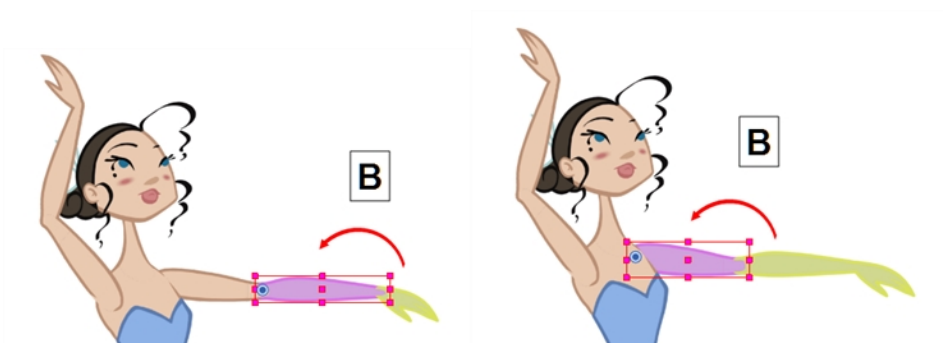
- Repeat this process for all the poses.

### How to select the parent or child layer

- In the Tools toolbar, select the Transform  tool.
- In the Transform Tool Properties view, make sure the Peg Selection  mode is deselected.
- In the Camera or Timeline view, select a layer attached to a hierarchy.



- From the top menu, select **Animation > Select Parent** or press B to select the parent layer. Select **Animation > Select Child** or press Shift + B to select the child layer.




### How to set ease on multiple parameters

- In the Timeline view, select a keyframe from one or more layers.

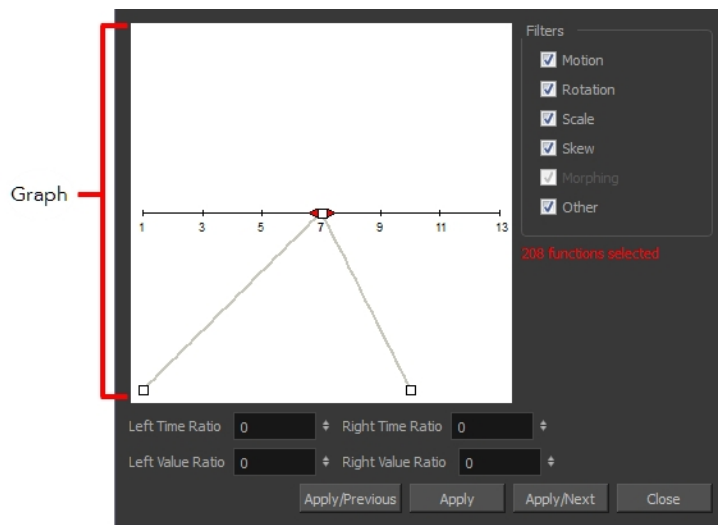


**NOTE:** Only the first keyframe selected on each layer is considered when using the Set Ease for Multiple Parameter function. If many keyframes are selected on the same layer, the ease values will be applied only to the first one and the rest will be ignored.

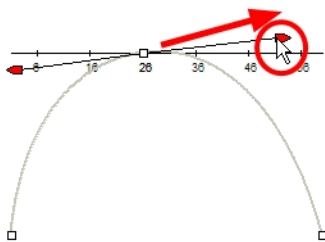
2. Do one of the following:

- ▶ In the Timeline view, right-click and select **Set Ease For Multiple Parameters**.
- ▶ In the Timeline toolbar, you can click the Set Ease For Multiple Parameters  button. If the button is not in the toolbar, you can add it through the Toolbar Manager. Right-click on the toolbar and select **Customize**.

The Set Ease For Multiple Parameters dialog box opens.



3. In the graph, pull on the Bezier handle to adjust the velocity for all the selected functions.



4. To apply these easing parameters to a certain type of function only, such as Rotation or Scale, in the Filters section, deselect the function types you do not want to affect.

- ▶ **Motion:** Applies the easing parameters to the selected Position X, Position Y, Position Z and 3D Path functions
  - ▶ **Rotation:** Applies the easing parameters to the selected Angle functions.
  - ▶ **Scale:** Applies the easing parameters to the selected Scale functions.
  - ▶ **Skew:** Applies the easing parameters to the selected Skew functions.
  - ▶ **Morphing:** Applies the easing parameters to the selected Morphing Velocity functions. Note that it is applied to the Morphing Velocity function in the Layer Properties window, not to the basic Morphing ease in the Tool Properties view.
  - ▶ **Other:** Applies the easing parameters to all the other selected functions, such as all functions created to animate effect parameters.
5. You can also adjust the easing by typing values in the Time Ratio and Value Ratio fields. The values are calculated in percentage.
- ▶ In the Left Time Ratio and Right Time Ratio fields, type the percentage value corresponding to the length of time you want the easing to last. The value must be between 0% and 100%.
  - ▶ In the Left Value Ratio and Right Value Ratio fields, type the percentage value of how strong you want the easing out. The value must be between 0% and 100%.
  - ▶ If your Time Ratio and Value Ratio values are equal, you will have a linear motion.
6. Click one of the following buttons:
- ▶ **Apply:** Applies the easing parameters to the selected keyframes.
  - ▶ **Apply/Previous:** Applies the easing parameters to the selected keyframes and then selects the previous keyframe in the timeline.
  - ▶ **Apply/Next:** Applies the easing parameters to the selected keyframes and then selects the next keyframe in the timeline.
  - ▶ **Close:** Closes the dialog box. If you did not apply the modifications, they will be cancelled.



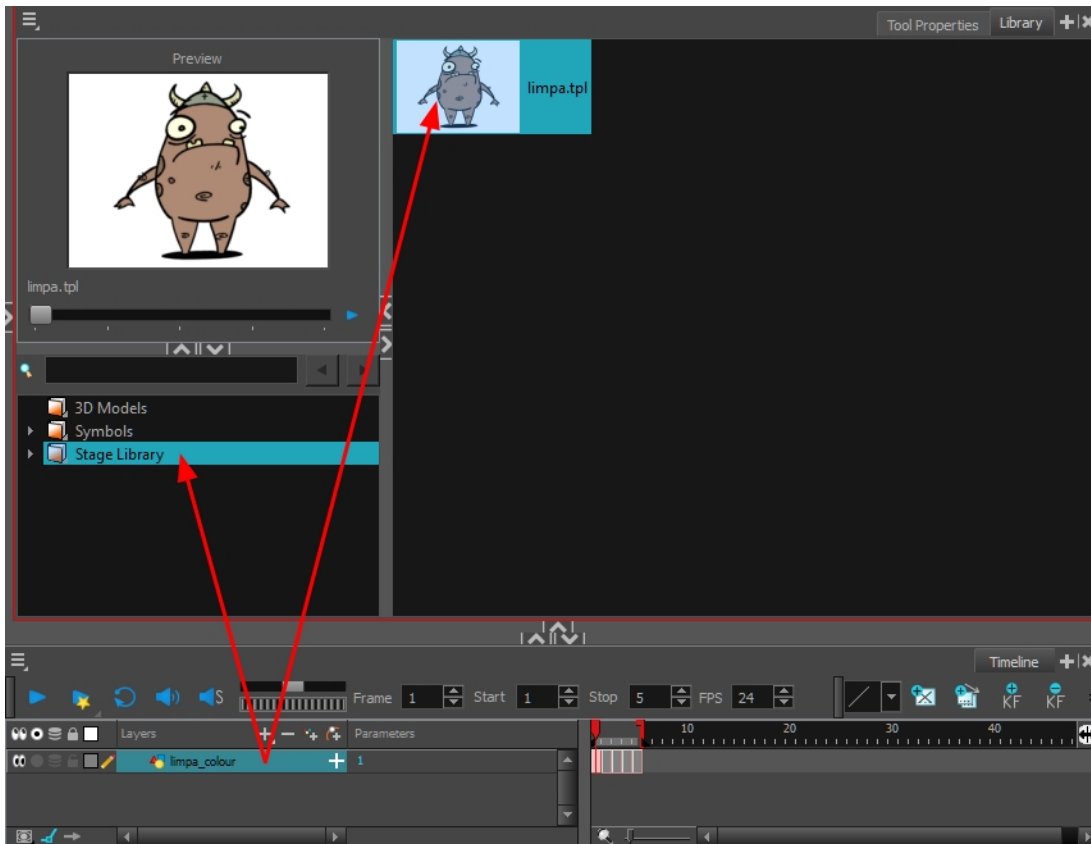
# Chapter 11: How to Create Templates

You can create a template from a layer or from cells. You can store anything available in the Timeline view as a template.

Creating a template by selecting a layer will incorporate the layer and all the drawings that were created in it, even if they're not exposed in the Timeline view. Selecting cells will only save those specific drawings in the template.

## How to create a template from the Timeline view

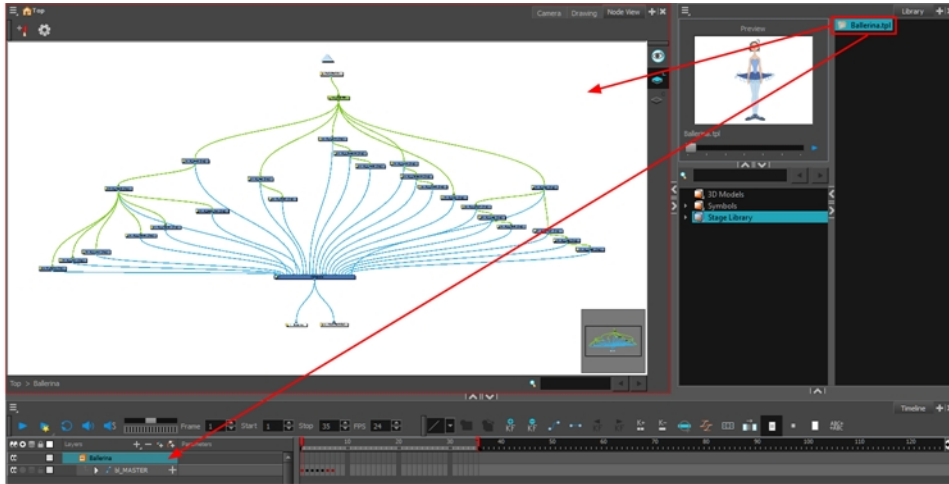
1. In the Timeline view, select some cells or layers.
2. In the Library view, select a folder to store the template.
3. If a library folder is locked, right-click and select **Right to Modify**.
4. Drag the selection to the Stage Library folder or any other library folder.



5. In the Rename dialog box, give the new template a name.  
To rename a template once it is created, right-click on the symbol and select **Rename**.
6. Click **OK**.

### How to import a template into the Timeline or Camera view

1. In the Library view, select the template you want to import.
2. Drag the selected template to the Camera view or to the left side of the Timeline view.



3. You can also drag a template to the right side of the Timeline view and into existing layers if the layer structure is the same as the existing one.



## Chapter 12: How to Set Up a Scene

Setting up your scene can be compared to building a set for a television show. This is the point when you position each scene element such as the camera frame, the background elements and the characters.



### Positioning the Camera

The scene action occurs inside the camera frame, so it's really important to set it up correctly. You can adjust the camera resolution and other parameters in the Scene Settings window. Refer to the Fundamentals Guide, *Starting Harmony* chapter to learn more.


The Camera layer is static which means that if you need to animate it, you must add a peg.

You need to add a camera layer to your scene, so you can edit the camera frame. You can only see one camera at a time. If you add several cameras to your scene, you can use the Camera list to select the active one. You could use this feature if you are still working on your scene composition and have different camera framing to try out.

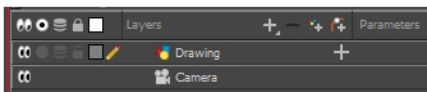
You can reposition your camera frame directly in the Camera view, using the advanced animation tools. Another way to set up your camera frame is to type the coordinates directly in the camera's properties. Doing this positions the camera precisely where you want it to be rather than gauging it visually.

You can easily reset the camera to its original position. Using the Reset command, you can reset the value of the selected element to the initial value of the active tool. For example, if the Rotate  tool is active, the transformation angle will be reset to 0 and if the Transform  tool is active, then all parameters values will be reset.

#### How to add a camera in the Timeline view


1. Do one of the following:
  - ▶ In the Timeline view, click the Add Layer  button and select **Camera**.
  - ▶ From the top menu, select **Insert > Camera**.


A new camera layer is added to the scene and appears in the Timeline view.



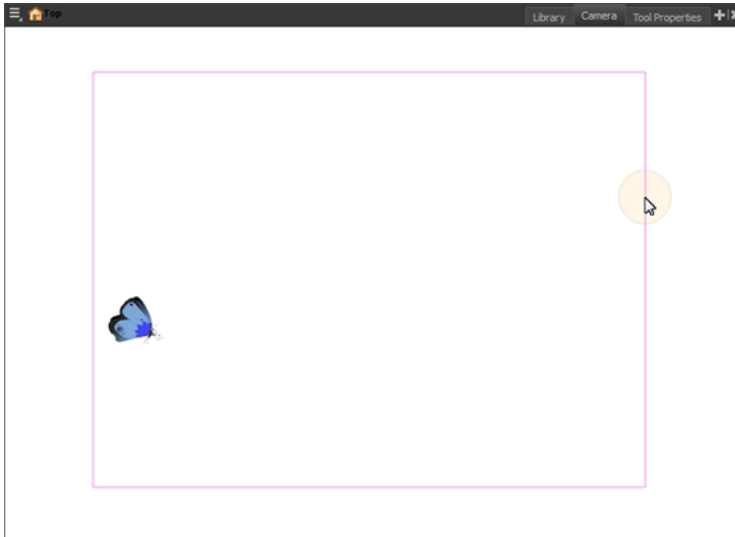
**NOTE:** You cannot add a camera inside a symbol.

#### How to reposition the camera frame directly in the Camera view

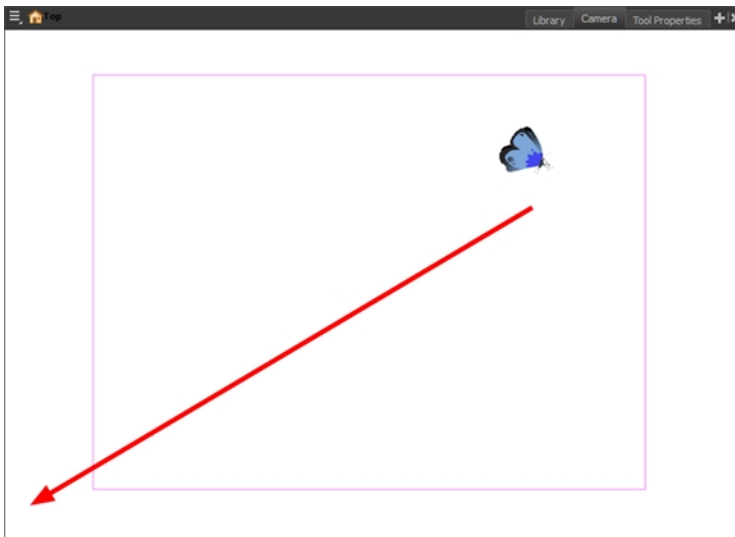
1. In the Tools toolbar, disable the Animate  mode.
2. Do one of the following:
  - ▶ From the top menu, select **Animation > Tools > Translate**.


- ▶ In the Advanced Animation toolbar, click the Translate  tool.
  - ▶ Press Alt + 2.
3. In the Camera view, click on the camera frame (thin rectangle) to select it. You can also select the camera layer from the Timeline view.

The selected camera frame is highlighted.

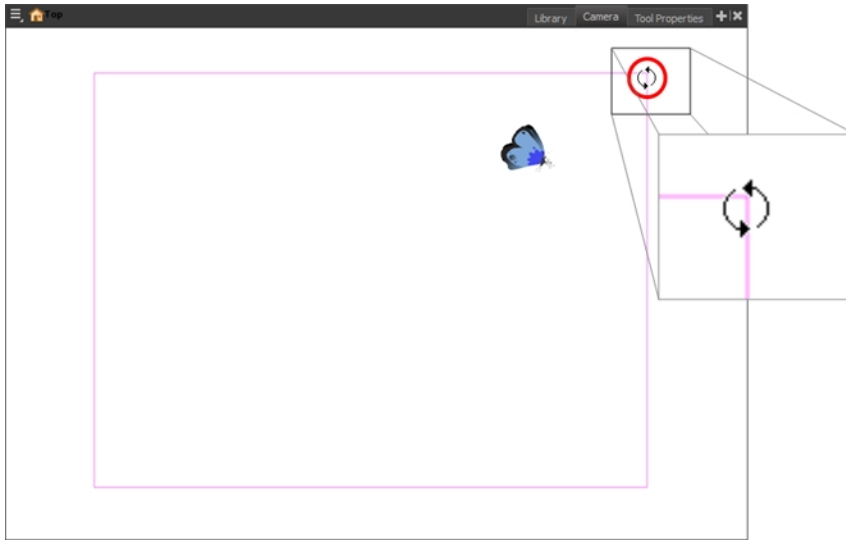


4. Drag the camera frame to a new position.




5. To tilt the camera frame, do one of the following to select the Rotate tool:
- ▶ From the top menu, select **Animation > Tools > Rotate**.
  - ▶ In the Advanced Animation toolbar, select the Rotate  tool.
  - ▶ Press Alt + 3.
6. In the Camera view, drag to rotate the camera frame until it reaches the desired rotation angle.





### How to reset the camera position




1. In the Tools toolbar, select the Transform  tool or press Shift + T.
2. In the Timeline or Camera view, select the camera layer.
3. From the top menu, select **Animation > Reset** or press Shift + R.

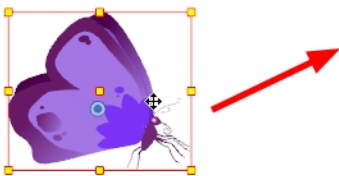
The camera automatically returns to its original position.

## Positioning Objects




Setting up the scene also involves positioning the different scene elements within the camera frame.

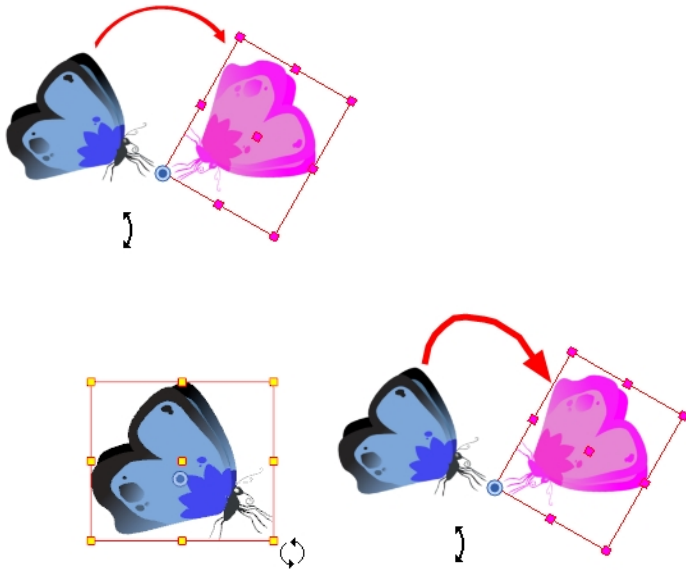
### How to pan a layer using the Transform tool

1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer and drag the selection to a new area. You can select multiple layers to reposition them at the same time. Hold down Shift and select the different layers.



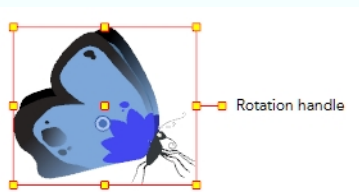
### How to rotate a layer using the Transform tool

1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer.
5. Place the pointer outside of a corner of the bounding box and drag to rotate.






#### NOTE:

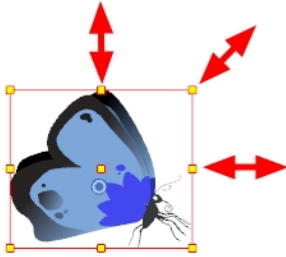
You can display a rotation handle on the bounding box when transforming a layer. In the Preferences dialog box, select the Camera tab and then select the **Use Rotation Lever with Transformation Tools** option. This preference is off by default.






### How to scale a layer using the Transform tool

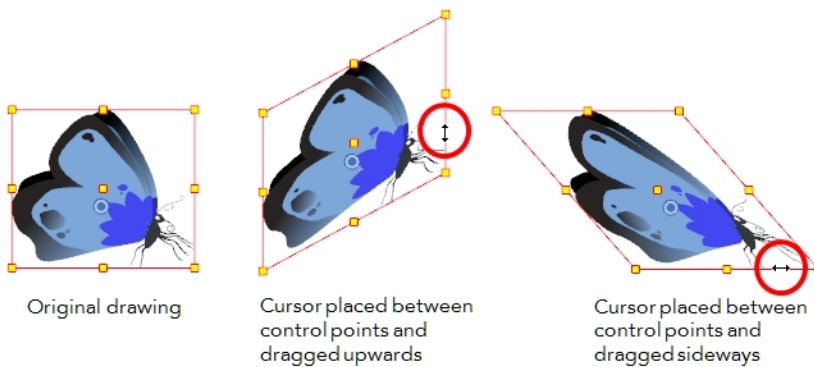
1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.

3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer and push or pull on the size, top, or corner control point. Hold down Shift to lock the selection's aspect ratio.



### How to skew a layer using the Transform tool






1. In the Tools toolbar, disable the Animate  mode.
2. In the Tools toolbar, select the Transform  tool or press Shift + T.
3. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.
4. In the Camera view, select a drawing layer.
5. Place the pointer between two controls points and drag sideways or up and down.



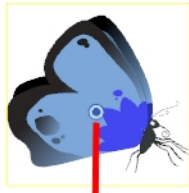
## Repositioning the Pivot

Transformations, such as rotation, scale, skew and flip, are made relative to the pivot point position. You can reposition this pivot point anywhere using the advanced animation tools.

### How to permanently reposition the pivot point

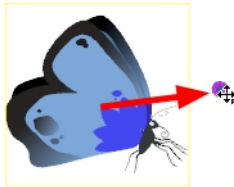
1. In the Advanced Animation toolbar, select the Translate , Rotate , Scale , or Skew  tool.
2. In the Camera view, Ctrl + click (Windows/Linux) or  + click (Mac OS X) to select your element.

The pivot point appears in the Camera view.



Pivot point

3. Drag the pivot point to a new position.



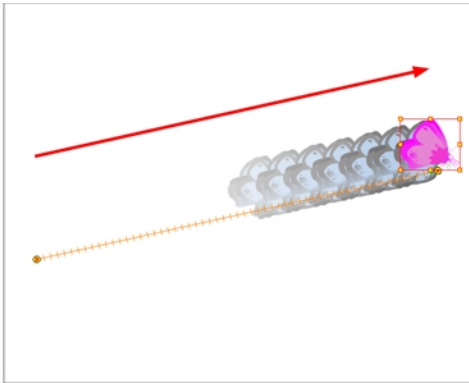
All transformations, including existing ones will be recalculated from this new pivot position.

# Chapter 13: How to Animate Objects and the Camera

When it comes to animating objects, you will do this on layers by creating motion paths. You can also animate the camera which is just like any other object you can animate.

## Animating a Layer

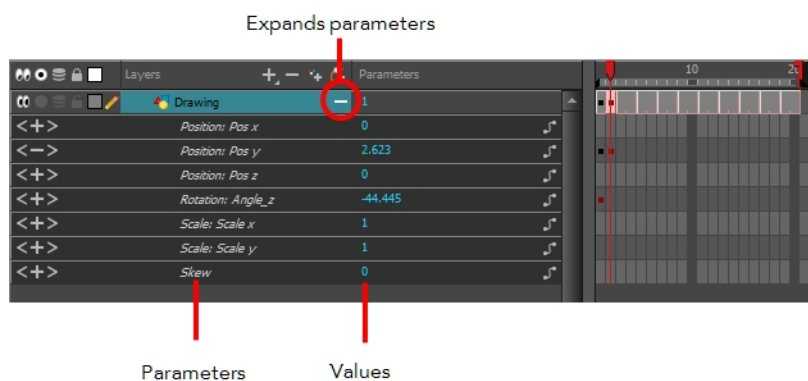
You can create a motion path directly on layers (animated layers).





You can control and define a trajectory using several different parameters, including:


- X, Y and Z positions (3D Path or Separate Positions)
- Angle (rotation)
- Skew
- X and Y Scales

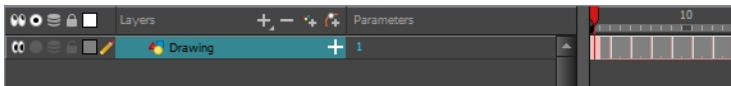
Each parameter has its own function curve where you can add keyframes and control the easing. If you're not familiar with graphs and function curves, these are easy-to-use tools for visually controlling trajectories in the Camera and Timeline views.



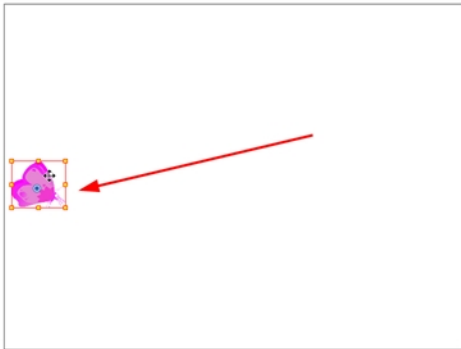
### How to animate a layer

1. In the Tools toolbar, select the Transform  tool or press Shift + T.
2. In the Tool Properties view, make sure the Peg Selection Mode  is deselected.

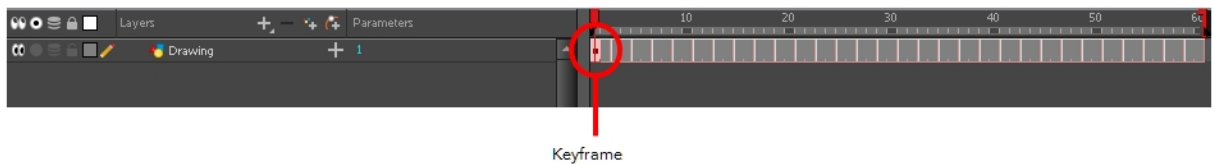
3. In the Tools toolbar, enable the Animate  mode. This will create keyframes at the current frame when moving objects.
1. In the Timeline view, go to the first frame.



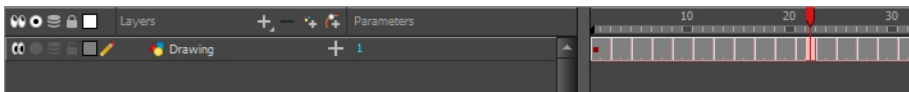
2. In the Camera view, select the element to animate and move it to its first position.



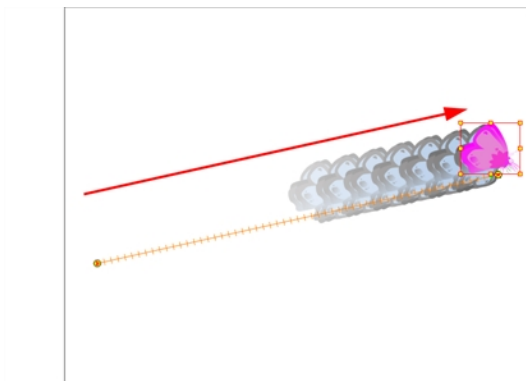
A keyframe is created on the first frame of the Timeline view.



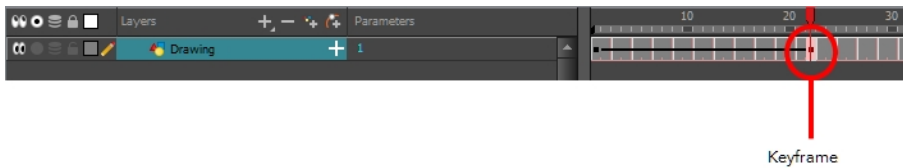
3. In the Timeline view, go to the frame on which you want to set the second position.



4. In the Camera view, move the element to its second position.



A second keyframe is created on the Timeline view.

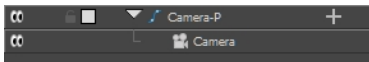


5. Play back  your animation.

To see your motion animations in the Top, Side or Perspective views while you play back, you must turn on the Playback option. From the top menu, select **Play > Enable Playback > Top View** or **Side View** or **Perspective View**.

## Animating the Camera

The camera is treated the same way as any other element. You can use the same tools and selection modes to offset or animate it, but the camera is a static object. To animate the camera, you need to connect it to a peg layer. A peg is a trajectory layer.




While making camera moves, you can use the Top, Side, and Camera views.

### How to open the Top and Side views

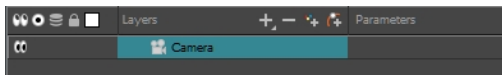
1. Do one of the following:
  - ▶ From the top menu, select **Windows > Top** or **Side**.
  - ▶ From any view already open, click the Add View  button at the top-right corner and select **Top** or **Side**.


### How to add a camera and parent it to a peg

1. If you don't already have a camera layer, do one of the following:
  - ▶ From the top menu, select **Insert > Camera**.
  - ▶ From the Layers toolbar, click the Add Layers  button and select **Camera**.

A new camera layer is added to the scene and appears in the Timeline view.

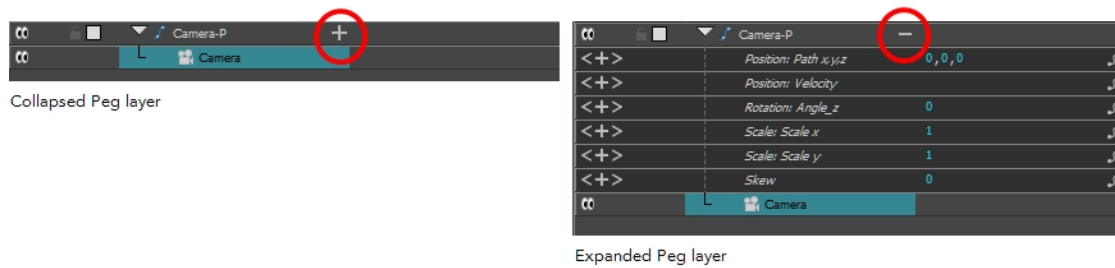
2. In the Timeline view, select the Camera layer.




3. From the Layers toolbar, click the Add Peg  button.

A Peg layer appears directly above the Camera layer, which is automatically attached to it.




The Peg layer automatically takes the name of the camera and adds the suffix **-P** to indicate that it is a Peg layer, for example **Camera-P**.

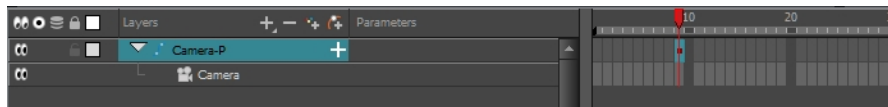


If the new Peg layer did not appear directly above the camera, you may have clicked elsewhere in the scene, which deactivated the layer on which you want to add the Peg layer. To fix this:

- ▶ Select the Camera layer and drag and drop it under the new Peg layer. Or delete the misplaced Peg layer, select the Camera layer and click the Add Peg  button again.
- ▶ You can unparent layers by holding down Shift and dragging the selected parents away from the child layer. Drop your selected between other layers.

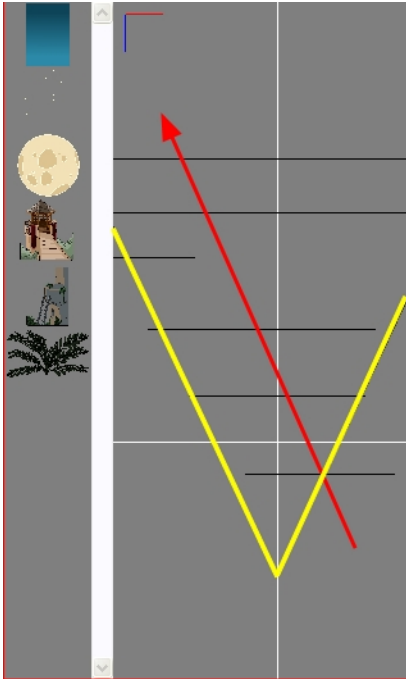
### How to animate the camera

1. In the Tools toolbar, enable the Animate  mode.
4. In the Tools toolbar, select the Transform  tool or press Shift + T.
2. On the right side of the Timeline view, on the Camera Peg layer, select the frame at which you want the camera move to start.
3. Do one of the following:
  - ▶ In the Timeline toolbar, click the Add Keyframe  button.

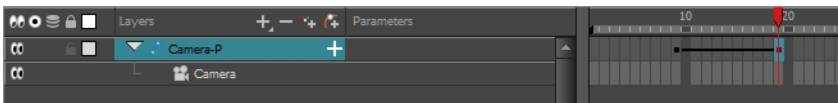


- ▶ Right-click and select **Insert Keyframe**.
  - ▶ Press F6.  
A keyframe appears in that cell. Any frames preceding this keyframe cell will hold the same camera position as this keyframe.
4. In the Top, Side or Camera view, select the camera (the large V-shaped cone) and move it to the desired position. In the Camera view, the camera is represented by a thin frame. You need to click directly on one of the edges.





5. On the Timeline view, click on another cell a bit further down in time to indicate where the camera move will end.
6. Select the camera in the Camera, Top or Side view and move it to the desired position.



A second keyframe appears and a line is created between the two frames to indicate that the subsequent motion between the frames will be calculated and rendered by the program.

7. Play back  your animation.

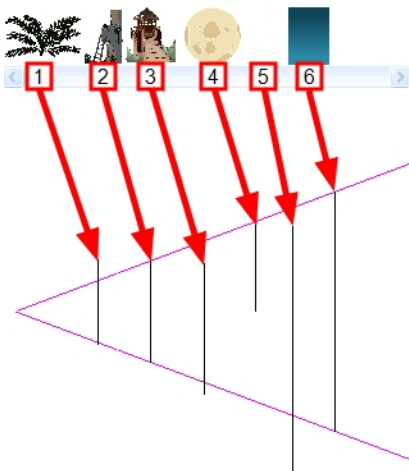


## Chapter 14: How to Create a Multiplane



To construct a multiplane, you must imagine what a real environment is like. Take a look at your background picture and imagine a camera moving through the space. Notice that objects in the picture move at different speeds depending on where they are in relation to the camera lens.

Building a multiplane requires an understanding of the scene's background, as well as the positioning of the elements on different layers.



For example, in the background illustrated above, the main objects to be separated are:

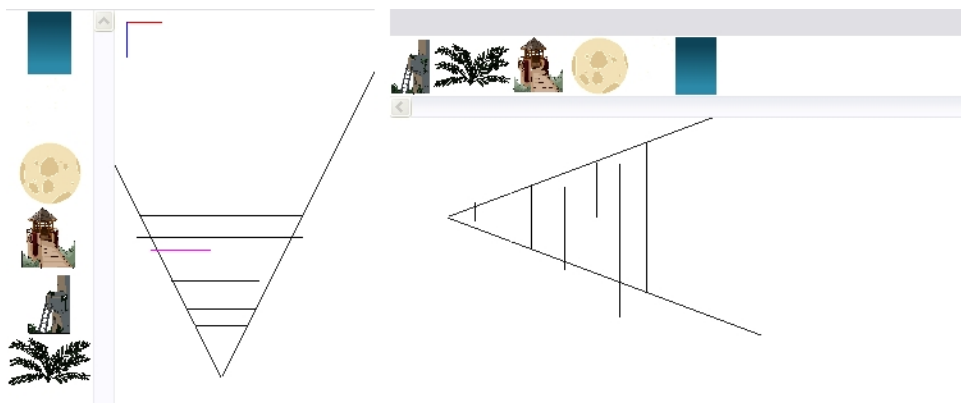
1. Fern
2. Front tower
3. Second tower
4. Moon
5. Stars
6. Sky

Although the bottom of the tower is hidden behind the plant and the ladder, each of the multiplane layers should be a complete drawing. This is because hidden portions may show up during a camera move later on in the scene.

You can position layers on the Z-axis using the Side and Top view.


Positioning your element closer to the camera makes them appear bigger. You can also move elements towards the camera or away from the camera while keeping the same size aspect ratio in the Camera view.

It is a good idea to keep a Camera view open to see what your scene looks like while positioning elements in the Top and Side views.

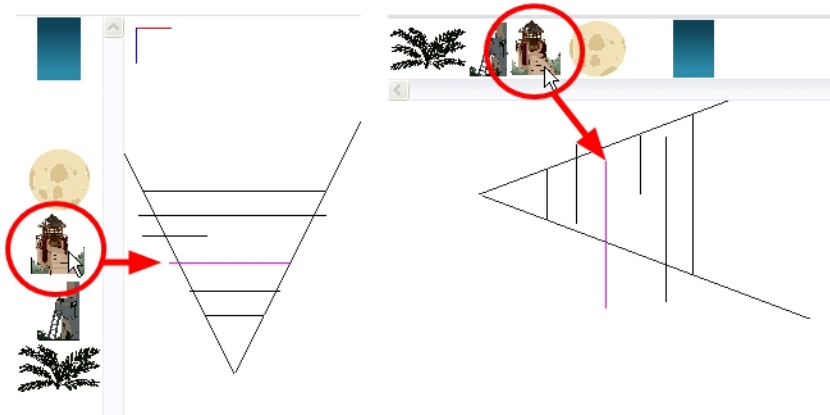


### How to position an element in the Top and Side views

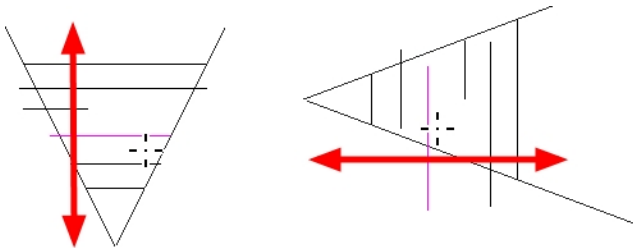
**NOTE:** Before distributing layers along the Z-axis using the Top and Side views, deselect the No Z Dragging option by selecting **Animation > No Z Dragging**. This option is disabled by default.




1. To maintain the visual scale in the Camera view as you move your element, do one of the following:
  - ▶ In the Advanced Animation toolbar, select the Maintain Size  tool.
  - ▶ From the top menu, select **Animation > Tools > Maintain Size**.
  - ▶ Press **Alt + 6**.
2. In the Side or Top view, select one of the layers in the thumbnails section. You can also select a layer from the Timeline view.

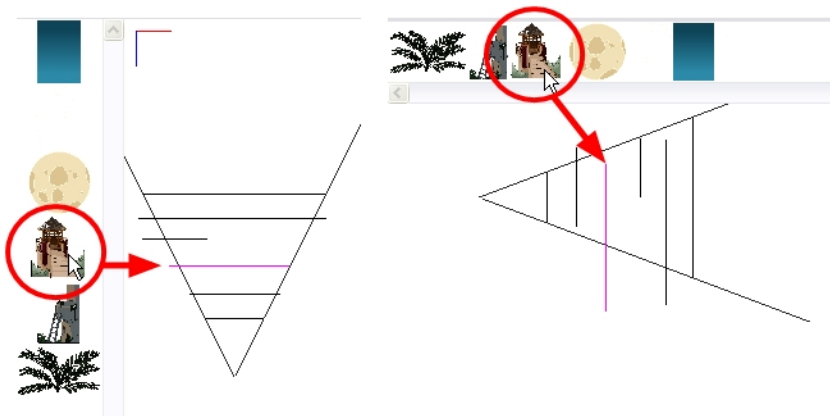
The selected layer is highlighted in the Top, Side and Camera views.



3. Drag the layer to the correct depth position in the camera cone. Your element aspect will remain the same in the Camera view.



4. For your element to scale up or down in relation to their distance to the camera, do one of the following:
  - ▶ In the Tools toolbar, select the Transform  tool. Make sure the Peg Selection Mode  option is disabled in the Tool Properties view.
  - ▶ In the Advanced Animation toolbar, select the Translate  tool and select a layer from the thumbnails section of the Top or Side view.
  - ▶ Select a layer from the Timeline view.  
The selected layer is highlighted in the camera cone.



5. In the Top view, drag the element sideways to position it horizontally. Hold Shift while dragging the element to make sure it only moves along the X-axis.

6. In the Side view, drag the selected element up or down to position it vertically. Hold Shift while dragging the element to make sure it only moves along the Y-axis.

## Chapter 15: How to Import Sound and Add Lip-Sync



If you decide to add sound to your animation, you must first prepare the sound outside of Harmony. Once this is done, you must add a sound element in Harmony to the organize the sound files in your animation. Sound will play in the movie until it reaches the end of the file or a stop frame that you created in the Sound Element Editor.

If you first create your project in Toon Boom Storyboard Pro, the sound will be cut up into the different scenes for you automatically.

You can import .wav, .aiff or .mp3 sound files.

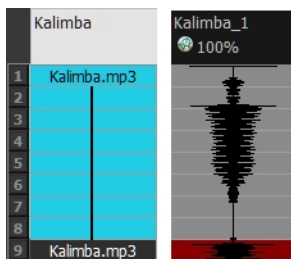
### How to import a sound file

- Do one of the following:
  - From the top menu, select **File > Import > Sound**.
  - In the Xsheet view, right-click anywhere in the frame area and select **Import > Sounds**.
  - From the Xsheet menu, select **File > Import > Sounds**.
  - From the Timeline menu, select **Import > Sounds**.

The Select Sound File dialog box opens.

- From the Select Sound File dialog box, find and select a sound file.

The sound file appears as a layer in the Timeline and Xsheet views.



Different views of the same sound file



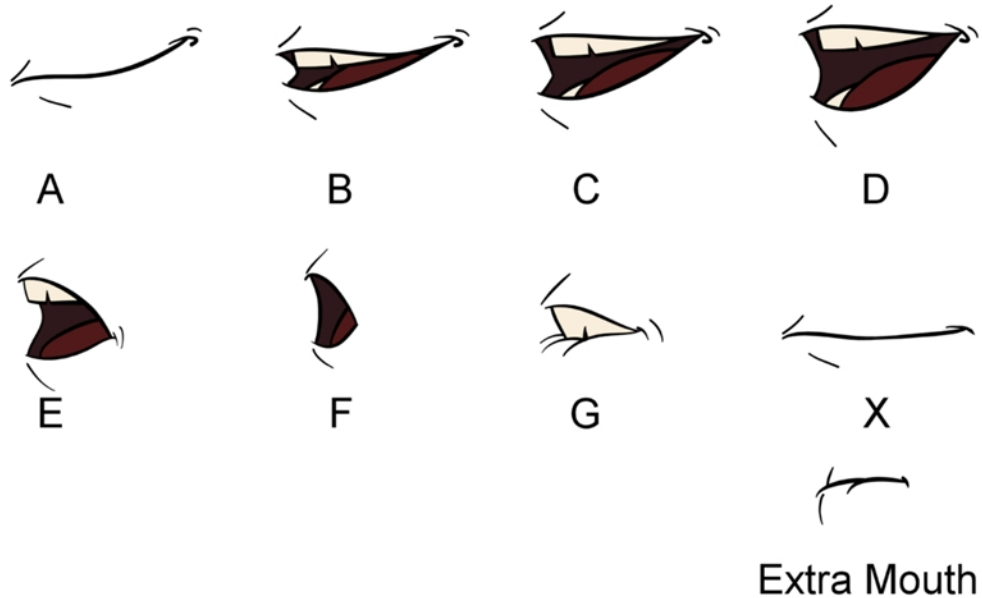
## Lip-Sync

Adding a lip-sync to a project can really enhance its quality and storytelling. However, it can be difficult to shape a character's mouth to match the sound at a precise frame.

To solve this problem, Harmony provides a lip-sync feature which analyzes the contents of a sound element and generates a mouth chart (see below) based on the eight animation phonemes (A, B, C, D, E, F, G, and X for silence).

The mouth shapes used by Harmony are based on the conventional mouth chart used in the animation industry.

**NOTE:** The letters used to represent the shapes do **NOT** correspond to an actual sound.



Here is an approximation of the sound each mouth shape can produce:

- **A:** m, b, p, h
- **B:** s, d, j, i, k, t
- **C:** e, a
- **D:** A, E
- **E:** o
- **F:** u, oo
- **G:** f, ph
- **X:** Silence, undetermined sound

You can lip-sync the traditional way or let the system automatically create the basic detection.

You can refer to the mouth chart positions as you draw the shape of the character's mouth.

### Automatic Lip-Sync Detection

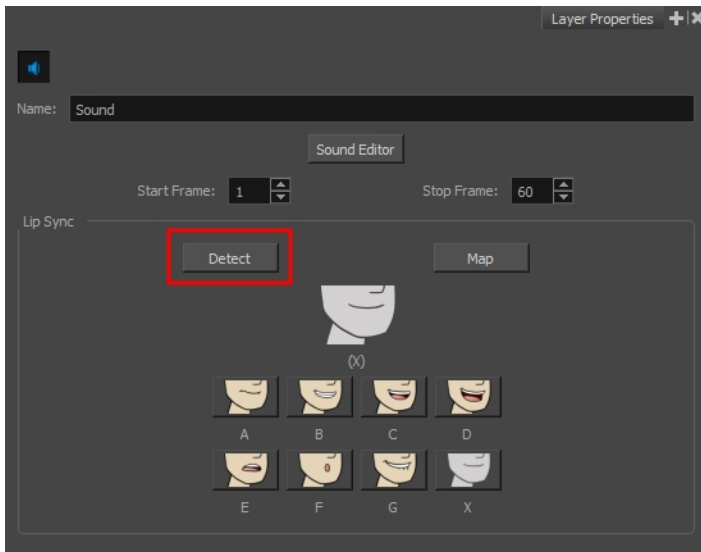
Harmony can automatically map drawings in an element to the mouth chart you have generated for a sound. This can save time when you are lip-synching a voice track.

In the Layer Properties view, you can identify each lip drawing of a character. Harmony then automatically labels all of the cells in the character's element with the appropriate name.



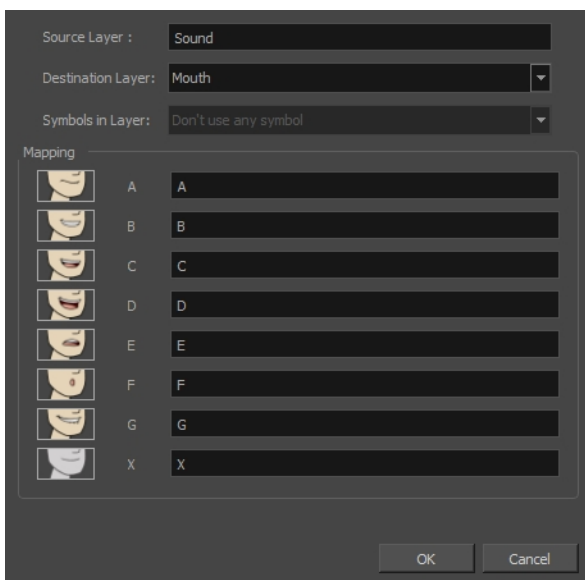
## How to generate a sound detection for lip-sync using the Layer Properties view

1. In the Timeline or Xsheet view, select the sound layer.  
The options for that layer will appear in the Layer Properties view.
2. In the Layer Properties, click **Detect**.

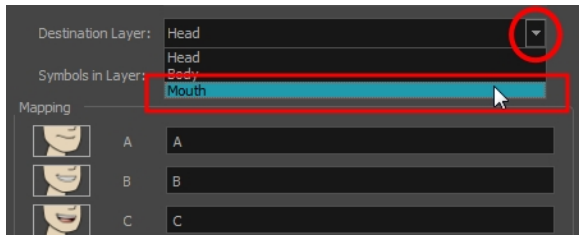




A progress bar appears while Harmony analyzes the selected sound clips and assigns a lip-sync letter to each sound cell.

3. Click the **Map** button to open the Lip-Sync Mapping dialog box.

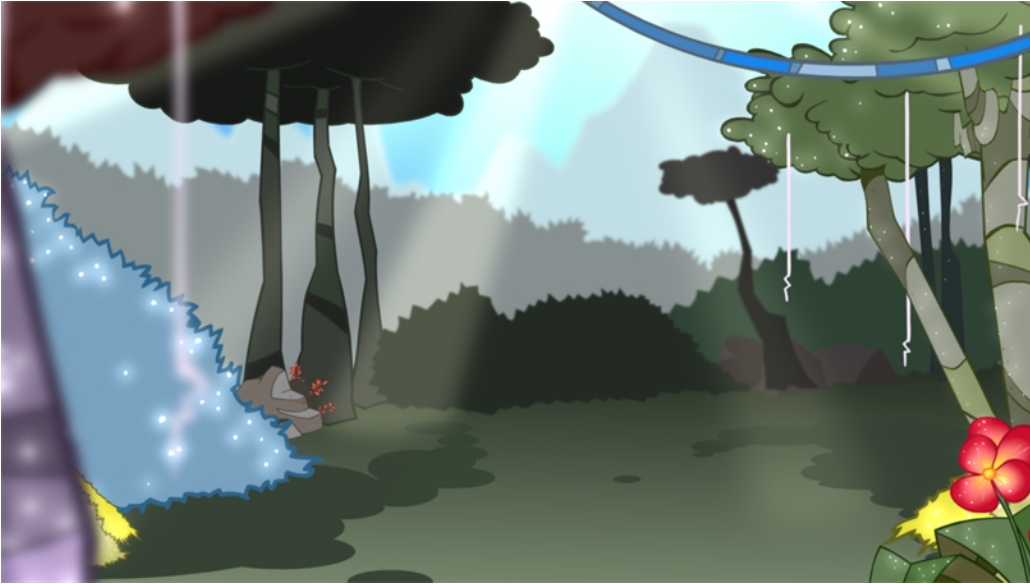


4. From the Destination Layer menu, select the layer that contains the mouth positions for the character's voice track.



5. If the selected layer contains symbols, you can map the lip-sync using drawings located directly on the layer or use the symbol's frames. In the Symbol Layer field select **Don't Use Any Symbol** if you want to use the drawings or select the desired symbol from the drop-down menu.
6. In the Mapping section, type the drawing name or Symbol frames in the field to the right of the phoneme it represents. If your drawings are already named with the phoneme letters, you do not have to do anything.
7. Click **OK**.
8. Press the Play  button in the Playback toolbar to see and hear the results in the Camera view. To play back your scene with sound, enable the Sound  button in the Playback toolbar.

## Chapter 16: How to Add Effects to a Scene



Once your animation is completed, you can add effects such as blurs and glows to make your project look even better! Harmony provides you with a series of essential effects that you can add to your layers.

### About Effects

An effect always needs a drawing connection and sometimes a matte or shape connection. A matte provides drawing information that determines the area on which the effect will be applied on the drawing. The details and colours within the matte drawing don't matter, as only the shape and transparencies are used. A matte is also known as *mask*.

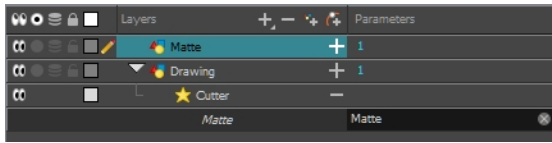
The matte principle can be demonstrated with the Cutter effect.



The Cutter effect cuts out a portion of an image using a matte drawing. You can use the Cutter effect to allow a character to disappear behind a background element or to cut a virtual hole into the layer itself. The Cutter requires a matte input.

Adjust the Cutter properties to invert the effect of the matte on an image. Instead of the object being hidden by the mask, it will only be visible where it intersects with the matte shape area.


You can adjust the effect parameters in the Layer Properties view and link any of them to a function column to be animated over time. This means that all of the effects can be customized.



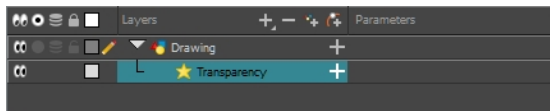
## Adding Effects



In Harmony, you can add effects through the Timeline view, connecting them to your drawing layers and then adjusting the parameters until you achieve the look you want.

### How to add effects in the Timeline view

1. In the Timeline view, select the layer on which you want to add an effect.
2. Do one of the following:
  - ▶ From the top menu, select **Insert > Effects > *desired effect***.
  - ▶ In the Layers toolbar, click the Add Layers  button and select **Effects > *desired effect***.
  - ▶ From the Timeline menu, select **Insert > Effects > *desired effect***.

The effect appears in the Timeline view.

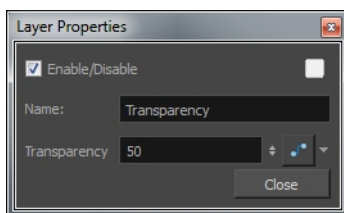


3. In the Camera view, click the Render View  button to see the scene's rendered current frame and effect. Note that most effects cannot be played back in real time. You need to use the Render and Play  option in the Playback toolbar.

**NOTE:** If your background appears all in black, it's because you need to add a Colour Card. To do this, follow step 2.

1. In the Timeline view, double-click on the effect layer to open the Layer Properties window. You can also select the effect layer and see its properties in the Layer Properties view.

The Layer Properties view opens, displaying the parameters available for the selected effect.



2. In the Layer Properties view, adjust the effect's parameters.

- To play back your scene with the final effects, in the Playback toolbar, click the Render and Play  button.

**NOTE:**

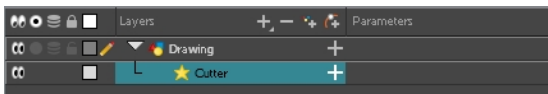
Once you have set the parameters for the effect, you can store it in the Library view as a template, so you can quickly reuse it without resetting the parameters again—see *Templates* in Chapter 7: Library of the Cut-out Animation Guide.

## Cutter Effect




The Cutter effect cuts out a portion of an image using a matte drawing. You can use the Cutter effect to allow a character to disappear behind a background element or to cut a virtual hole into the layer itself. The Cutter requires a matte input.

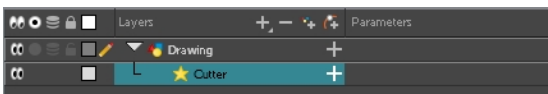
Adjust the Cutter properties to invert the effect of the matte on an image. Instead of the object being hidden by the mask, it will only be visible where it intersects with the matte shape area.




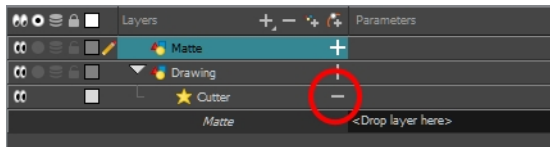
### How to use the Cutter effect

- Select a drawing layer.
- Click the Add Layers  button and select **Effects > Cutter**.

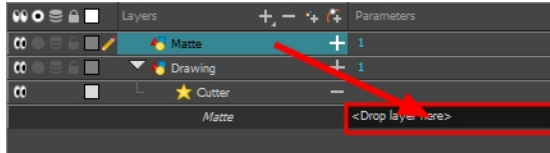
The Highlight effect is parented to the selected layer.



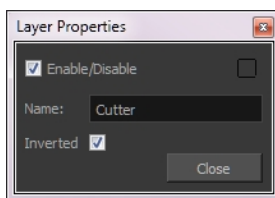
- In the Drawing or Camera view, create a drawing on a new layer that will act as the matte.
- In the Timeline view, click the Collapse/Expand  button on the effect layer.



4. Drag and drop the matte layer beside the Matte field.



5. Display the Cutter properties and adjust the properties to control the type and amount of blur and the colour of the Cutter effect.



## Cutter Properties

| Parameter | Description  |
|-----------|--|
| Name      | Allows you to change the node's name.  |
| Inverted  | When this option is enabled, the Cutter node will invert the matte shape to cut the drawing. Instead of cutting the image intersecting with the matte, it will cut any artwork outside of the matte shape. |

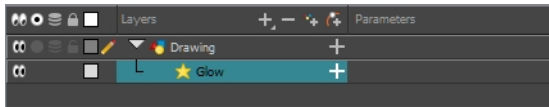
## Animating an Effect Over Time

When compositing your scene, you will often want to animate the parameters of an effect over time. For example, you may want an object to fade in or out by changing the transparency level over time or by increasing the colour contrast on one of your drawings over a certain frame range.


To animate an effect over time, create a function curve by adding keyframes to the parameters you want to animate. To do this, you will use these views: Layer Properties and Timeline. You can fine tune your animation using the Function view.

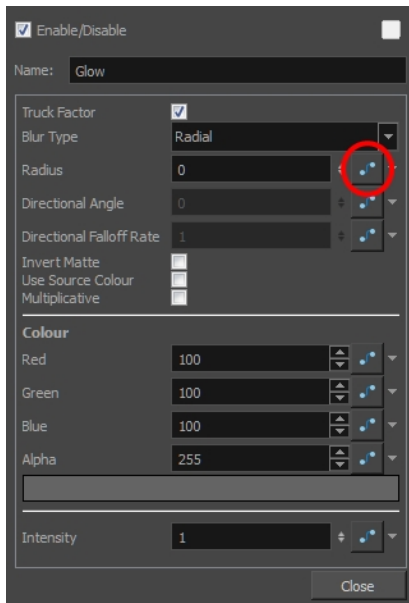
### How to animate an effect over time



1. In the Timeline view, select a layer and add an effect to it by doing one of the following:
  - ▶ Click the Add Layer **+** button and select **Effects > desired effect**.
  - ▶ Right-click and select **Insert > Effects > desired effect**.
  - ▶ From the top menu, select **Insert > Effects > desired effect**.

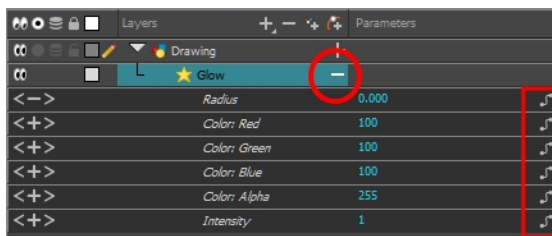


2. Create the function curve by doing one of the following:


- ▶ Double-click on the effect layer to display the effect properties. Click the Function  button of the parameter you want to animate and create a function curve.



- ▶ In the Timeline view, expand the effect layer's parameters by clicking the Collapse/Expand  button. Then click the Function  button of the parameter you want to animate and create a function curve.



3. In the Timeline view, go to the frame on which you want to start animating the effect.

4. In the Timeline toolbar, click the Add Keyframe  button.

5. In the Value field of the parameter you want to animation, enter the keyframe value. If your keyframes are stop-motion keyframes, in the Timeline view, select the new keyframes. Right-click and select **Set Motion Keyframe**.



6. Repeat this process for each keyframe to be added.



# Chapter 17: How to Export a Movie

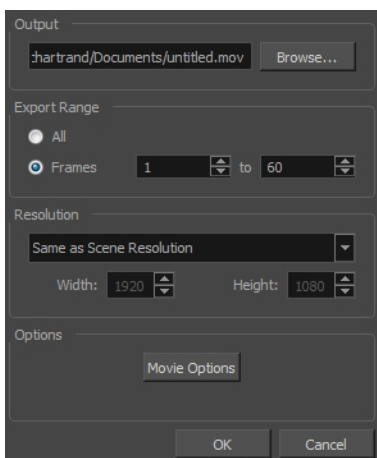
If you require a video file, you can export your animation as a QuickTime movie. To render a QuickTime movie with transparency, you need to set the Depth to Millions of Colours +. You can set this when exporting a QuickTime movie.

If your exported video is too small or too large, you can change the project size from the top menu in **Scene > Scene Settings**. This will change the size of the video output.

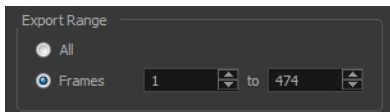
## How to export a QuickTime Movie

1. From the top menu, select **File > Export > Movie**.

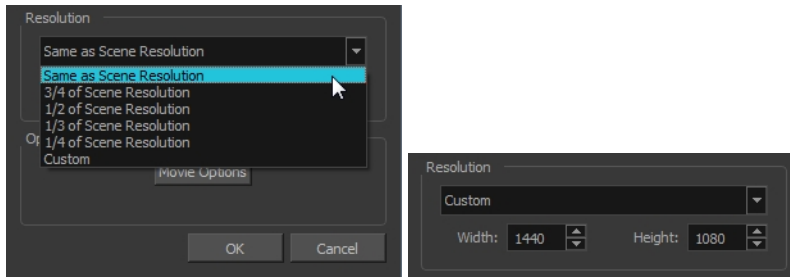
The Export to QuickTime Movie dialog box opens.



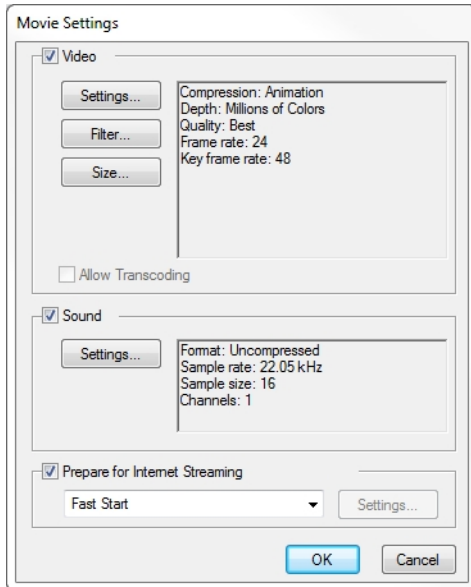
2. Click **Browse** and select a folder in which to save your movie and give it a file name for the export.
3. Click **OK**.
1. In the Display Source section, select the Display node to use for rendering your project.
2. From the Export Range section, decide whether you want to export the entire scene (All) or a specific frame range. If you decide on the latter, enter the frame range.



3. In the Resolution section, select one of the following from the menu:
  - A preferred resolution ratio.
  - **Custom**: Enables the Width and Height fields so you can enter a specific size.



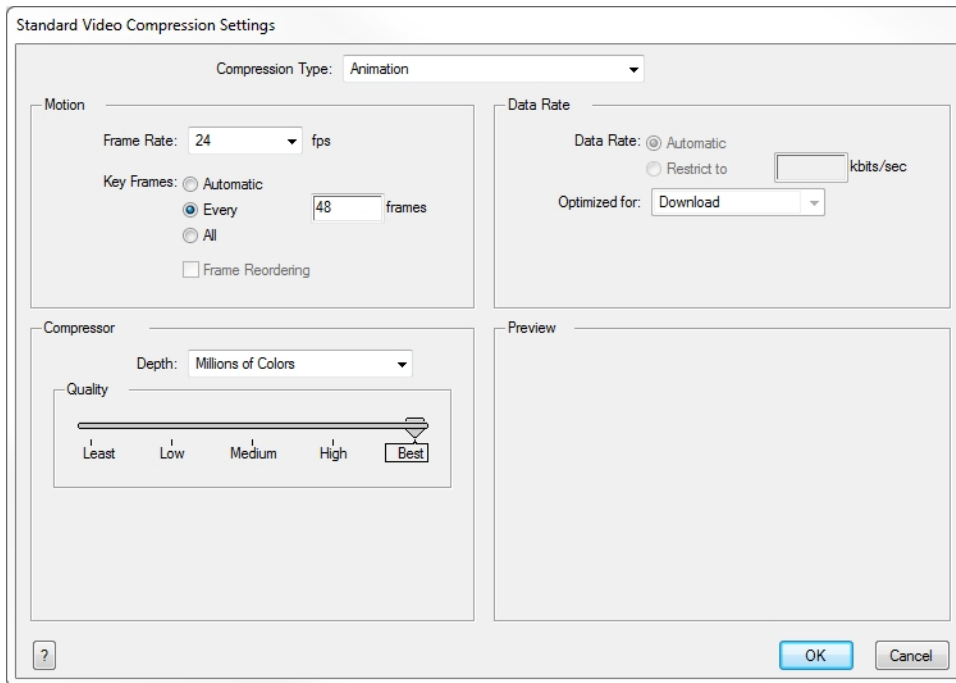
4. In the Options section, click **Movie Options**.



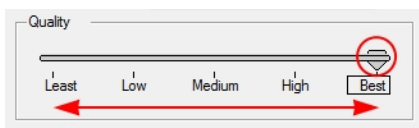
| Parameter                      | Description  |
|--------------------------------|--|
| Video                          | Enables the customization of the video settings, filters and size.   |
|                                | <b>Settings:</b> Opens the Standard Video Compression Settings dialog box (see below).   |
|                                | <b>Filter:</b> Opens the Choose Video Filter dialog box, where you can select from a range of filters to apply to your video export. |
| Sound                          | Enables the customization of the sound settings.   |
|                                | <b>Settings:</b> Opens the Sound Settings dialog box (see below).  |
| Prepare for Internet Streaming | Enables the customization of the Internet streaming options.   |

5. In the Video section, click **Settings**.

The Standard Video Compression Settings dialog box opens.



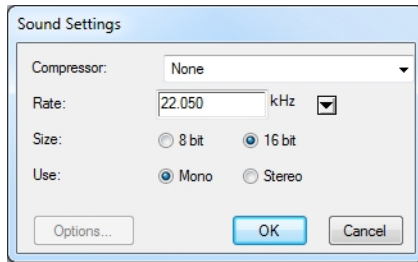
6. From the Compression Type menu, select a codec. The availability of certain compression settings depends on the Compression Type selected. For example, Animation is the default compression type and as a result the Data Rate option is greyed out.
7. In the Motion section, choose a **Frame Rate** from the list.  
By default, it is set to match the frames-per-second (fps) of your Harmony project. If you choose a lower frame rate, your export playback will be faster than your actual project. The reverse is also true for a higher frame rate.
8. If you want keyframes inserted, select the **Every** option and set the number per frame.  
This is the option is recommended by QuickTime. For further details, refer to the QuickTime documentation.
9. In the Compressor section, select a **Depth** based on your movie's needs. For example, Millions of Colours+ houses an alpha channel.
10. In the Quality section, use the slider to choose a quality setting. Remember that the better the quality of the export, the larger the file.



11. From the Data Rate section, either choose to allow the program to automatically select the most optimal bit rate, or enter a Restricted rate to save space and allow for faster downloading at a cost to the quality of the export.
12. In the same section, from the Optimized For menu, select the intended viewing method for the export.
13. Click **OK**.

- From the Movie Settings dialog box, click **Sound Settings**.

The Sound Settings dialog box opens.



- From the Compressor menu, select a compression type.

The default setting is None. This will preserve your original sound file without the loss of information. However, an uncompressed sound file will inevitably add “weight” to the overall size of your video export.

- From the Rate menu, select a rate.

It is best to check and match the original properties of your sound file. For example, if your file has an audio sample rate of 48 kHz and you choose a conversion rate of 22.05 kHz, the sound will play at the same speed, but with higher frequencies missing.

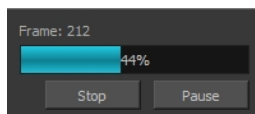
For a standard film sound quality, choose **44.1 kHz**, or **48 kHz** for DVD quality. Anything less will make the sound “dull” or less bright. For things like recorded voice, this doesn't matter so much, but for music it can make an audible difference.

If file size is a consideration, such as with videos for the Internet, then a lower rate might be more practical.

- Select the **Size** and **Use**, which are related. Once again, it is advisable to check your original sound file properties. If the file was recorded in one channel (mono), there is no point in choosing the two channel (stereo) option. Although Mono can support a 16-bit channel, the extra information is unnecessary. Mono is generally paired with 8-bit and Stereo with 16-bit.
- Click **OK**.

- In the Export to QuickTime Movie dialog box, click **OK**.

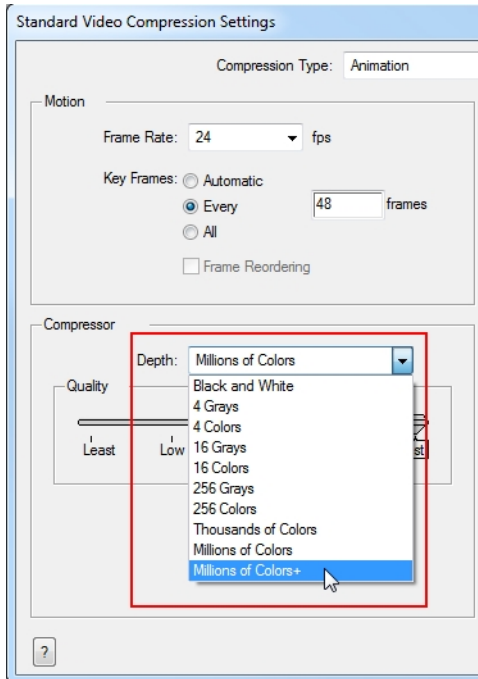
A progress bar appears.



- Browse to the location on your computer where you saved your QuickTime video and double-click on it to view the export.

### How to set the depth to Millions of Colours + to export a QuickTime movie with transparency

- ▶ In the Standard Video Compression Settings dialog box, select **Millions of Colors+** from the Depth menu.





## Glossary

|                                     |   |
|-------------------------------------|---|
| <b>alpha channel</b>                | An image channel that carries transparency information. An image already has three channels: red, green and blue (RGB). The alpha channel is the fourth channel (RGBA). The matte, or the transparency information, is stored in this fourth channel. An image without an alpha channel is always opaque.   |
| <b>animatic</b>                     | A movie with sound that is developed from the storyboard. The storyboard panel is exposed for the duration of the scene and at times, the characters are placed on a trajectory to indicate motion. The camera moves are also animated. The animatic is used to determine the rhythm of a project and provides a good overview of the project before beginning production.  |
| <b>animation</b>                    | A simulation of movement created by displaying a series of pictures or frames.  |
| <b>anime</b>                        | An animation style known for its sinister and dark feel; popular in Japan.  |
| <b>arc</b>                          | Action rarely occurs in a straight-forward manner; rather it typically unfolds in what storytellers refer to as an arc. The purpose of a story arc is to move a character or situation from one state or scenario to the next.  |
| <b>aspect ratio</b>                 | The relationship between the width and height dimensions for any scene, frame or film format. Television ratio is 4:3 and widescreen ratio is 16:9.   |
| <b>auto-feed</b>                    | An automated method of feeding drawings into a scanner in which multiple drawings are stacked into a sheet feeder. When the scanner is activated, the drawings are scanned consecutively, without further user intervention.  |
| <b>automatic lip-sync detection</b> | Automatically mapping drawings in an element to the mouth chart generated for a sound. This can save time when lip-syncing a voice track.   |
| <b>axis</b>                         | An imaginary line around which an object rotates.<br>For 2D graphics, there are two axes: X (horizontal) and Y (vertical).<br>For 3D graphics, there are three axes: X (horizontal, Y (vertical) and Z (depth).   |
| <b>background</b>                   | The part of a scene that is farthest to the rear. The background is the artwork, or decor, against which the animation takes place.   |
| <b>Bézier</b>                       | A method of defining curved lines invented by French mathematician Pierre Bézier. A Bézier curve is a mathematical or parametric curve. Bézier curves use at least three points to define a curve.  |
| <b>bitmap</b>                       | An image composed of pixels with a single resolution (size). If it is enlarged too much, it will lose definition and pixels will begin to appear. This is known as <i>pixelation</i> .  |
| <b>breakdown</b>                    | In cut-out animation, breakdown is the action of breaking a character into pieces to create a puppet with articulations. To break down a character, the artist cuts parts, such as the hands and arms, from the character's model and pastes them in separate layers. Next, the joints are fixed and the pivots set.<br><br>In traditional animation, a breakdown is an animation pose generally found between two key poses. The key poses are the main poses in an animation and the breakdowns are secondary poses, ones that help describe the motion and the rotation curve (usually referred to as an <i>arc</i> ). |

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| <b>camera shake</b>      | Camera shake occurs in a scene when the camera moves slightly and quickly in several directions. This gives the impression of an impact, vibration or, for example, bumps on the road.   |
| <b>caption</b>           | A text field containing dialogue, effects, sound, or slugging information in a storyboard.   |
| <b>cel</b>               | In traditional animation, a cel (also known as <i>celluloid</i> ) is a transparent sheet on which the animation is inked and painted before being sent to the camera. The picture's outline is drawn on the front of the cel and then coloured along the back.<br><br>In Harmony, a cel is an individual space in an Xsheet column from which you can expose a drawing or a function's coordinate.                                       |
| <b>character design</b>  | Each character in an animated film is drawn from multiple angles in poster-style format, called a <i>model sheet</i> , which serves as a reference for the animators.  |
| <b>clean up</b>          | After rough drawings have been tested and approved, all the noise in the image (excess lines, notes, etc) is removed to create final drawings which can be inked, painted and shot. The cleanup process refers to either tracing a clean line over a rough drawing to achieve the final version, or removing dirt and extra lines left by the scanning process.  |
| <b>CMYK</b>              | Cyan, Magenta, Yellow, Black. Refers to the process used by printers to define colour on the printed page.   |
| <b>colour card</b>       | A colour card is a solid colour card that is the same size as the camera. The colour card can be used to fill the background with a solid colour when there is no background image included.   |
| <b>colour model</b>      | The official colour design that must be used to paint the animation. A model is the definitive character, prop, or location design that each artist must follow for the production.  |
| <b>colour wheel</b>      | A display of the colour spectrum in the form of a circle.  |
| <b>compositing</b>       | Compositing is the action of incorporating all of a scene's elements to create the final result prior to rendering. For example, the compositing artist will import all the animation sequences, background, overlays and underlays in the scene and position them correctly. The artist will then set the camera frame and animate it, if needed. Finally, the animator will create all the computer-generated effects for the project. |
| <b>cross dissolve</b>    | An effect used to fade two scenes, one into the other.   |
| <b>cut</b>               | A direct transition between two scenes. When a cut is used, there are no transition effects inserted to pass from one scene to the next. The first scene ends and the second one starts immediately.   |
| <b>cut-out animation</b> | The action of animating characters made of several pieces by moving them around frame by frame. Cut-out animation can either be computer generated or done traditionally using paper.  |
| <b>cycle</b>             | A group of images that together make up an action, such as walking. A cycle is an action repeated as a loop over a period of time. It can be a series of animated drawings or keyframes.   |



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| <b>dialogue</b>          | The text spoken by a character in a movie or animation.  |
| <b>dope sheet</b>        | Used by animators, directors and other members of a crew to track the sequence and timing of images, dialogue, sound effects, sound tracks and camera moves. Also known as an <i>exposure sheet</i> or <i>Xsheet</i> .   |
| <b>doping</b>            | To assign a particular drawing to a range of frames.   |
| <b>DPI</b>               | Dots per inch is the standard measure of resolution for computerized printers. It is sometimes applied to screens, in which case it should more accurately be referred to as <i>pixels per inch</i> . Either way, the dot is the smallest discrete element making up the image.  |
| <b>ease/velocity</b>     | In animation, the ease, also known as <i>velocity</i> , is the acceleration and deceleration of a motion. It can be a motion created by a function curve, or a series of animated drawings. Other common terms for ease-in and ease-out are slow-in and slow-out.  |
| <b>ease-in</b>           | Gradual acceleration in the action. Also known as <i>slow-in</i> .   |
| <b>ease-out</b>          | Gradual deceleration in the action. Also known as <i>slow-out</i> .  |
| <b>establishing shot</b> | A scene in which the viewer can see the whole area in which a sequence is happening. For example, if a child is playing on the ground in front of his house, the establishing shot would be a scene where the viewer can see the house, the ground, a part of the street and the buildings around the central point of action. This helps the viewer understand the story location and scene orientation.  |
| <b>exposure</b>          | In animation, an exposure is the number of cels on which a drawing appears in the scene. For a drawing to appear longer, the exposure must be extended over a greater number of cels.  |
| <b>exposure sheet</b>    | A sheet with several vertical columns and horizontal frames used to indicate a scene's timing. Each column represents a scene layer. The drawing numbers in each column are indicated and repeated over the particular amount of frames they need to appear.<br><br>The exposure sheet is used by animators, directors and other members of a crew to track the sequence and timing of images, dialogue, sound effects, sound tracks and camera moves. Also known as a <i>dope sheet</i> . |
| <b>fade in/fade out</b>  | Fade in or fade out is a transition effect used to open or close a sequence. A fade in occurs when the first scene appears progressively, from complete transparency to its complete opacity. A fade out occurs when the last scene progressively disappears, going from complete opacity to complete transparency.  |
| <b>fast-in</b>           | Dramatic acceleration at the start of the action.  |
| <b>fast-out</b>          | Dramatic acceleration at the end of the action.  |
| <b>field</b>             | In animation, a field is a measurement unit used to calculate motion, registration and camera positioning. A standard animation scene will vary between 6 to 12 fields.  |
| <b>field chart</b>       | A guide containing all the field units that animation and layout artists use to determine a scene size or camera motion.   |

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| <b>film-1.33</b>          | A resolution that is ideal for the widescreen film format that conforms to the standard 4:3 pixel aspect ratio.   |
| <b>film-1.66</b>          | A resolution that is ideal for the widescreen film format that conforms to the 16:9 pixel aspect ratio. (The pixels are wider than they are high).  |
| <b>flipping</b>           | In traditional animation, flipping is the action of going through the drawings of an animation sequence very quickly in order to see the animation in motion. Flipping can also be the action of creating a mirror transformation of an object.   |
| <b>follow-through</b>     | The secondary motion caused by the main action. For example, a character wearing a cloak is running. The main action is the body running. This will cause the cloak to follow the motion, although it will not move at the same time, but react a few frames later and follow the main motion curve.  |
| <b>forward kinematics</b> | Forward kinematics is a feature used to animate principally 3D characters and cut-out puppets with hierarchy. It is used to animate a puppet from one of parent parts, such as a shoulder, and make the rest of the arm move with it as a single piece.   |
| <b>frame</b>              | A single photographic image in a movie. In traditional animation, the North American standard generally contains 24 frames per second, while in Europe the standard is 25 frames per second.  |
| <b>frame rate</b>         | <p>The frame rate is the speed at which the frames are played. They are generally calculated by frame per second. For example, a scene could be played back at 12, 24, 25, 30 or 60 frames per second or any other number.</p> <p>This is the measurement of the frequency (rate) at which an imaging device produces unique consecutive images, called <i>frames</i>. The term applies equally to computer graphics, video cameras, film cameras, and motion capture systems.</p> <p>Frame rate is most often expressed in frames per second (fps) and in progressive-scan monitors as hertz (Hz).</p> |
| <b>functions</b>          | A computer-generated motion, trajectory or path on which elements, other trajectories and effects parameters can be attached. The function can be controlled by adding keyframes and control points on the function curve.  |
| <b>gamut</b>              | The range of colours that a particular device can represent.  |
| <b>HDTV</b>               | High Definition Television delivers a higher quality image than standard television does because it has a greater number of lines of resolution. To take advantage of the superior quality and make full use of your resolution setting, the output device must be compatible with HDTV technology.   |
| <b>hold</b>               | A frame in the animation in which the character maintains its position without moving. A hold can be created between any two keyframes.   |
| <b>HSV</b>                | Hue, Saturation, Value. A method of defining colours in terms of hue (tint), saturation (shade) and value (tone or luminance).  |
| <b>in-between</b>         | The drawings that exist between the key poses. These are drawn to create fluid transitions between poses.   |
| <b>ink and paint</b>      | The ink and paint process is the action of painting the empty zones and   |

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|                                  | colouring the lines on the final animation drawings, while following a colour model.  |
| <b>interpolation</b>             | The computer-generated motion created between two keyframes. You have the choice to create interpolation, or not, between your keyframes.   |
| <b>jump cut</b>                  | A jerky cut between two scenes. Typically, a jump cut is not visually pleasing. It is generally caused by one scene ending, and a second one starting, with a similar image. The lack of difference causes the eye to see a little jump between the two scenes.   |
| <b>key pose</b>                  | Important positions in the action defining the starting and ending points of any smooth transition. Keys, or key poses, are the main drawings in an animation sequence describing the motion. For example, if an arm is waving, the keys will be of the arm at one extremity of the wave motion and the other extremity. By flipping those drawings, the animator can see the skeleton of the motion without having all the drawings. |
| <b>keyboard shortcuts</b>        | One or more keyboard keys which, when used, cause an operation to be performed.   |
| <b>keyframe</b>                  | Important positions in the action defining the starting and ending points of any action. A keyframe is a computer-generated position at a specific moment (frame) on a given trajectory.  |
| <b>layers</b>                    | In animation, a layer is an individual column, level or character. A scene's layers are superimposed to form the final image.   |
| <b>layout</b>                    | <p>The communication step between the storyboard and the animation. It is the action of putting the storyboard on model. That is, drawing the character by following the design in the model pack, so the animator can start working.</p> <p>The layout artist draws the background, creates the camera and field guide matching the scene and camera motion. Lastly, the animator draws on model the main action poses.</p>          |
| <b>layout and posing</b>         | The action of putting on model. That is, at the right scale, the storyboard for the animator to start working.  |
| <b>library</b>                   | A storage area containing templates and assets that can be reused in any project or scene.  |
| <b>light table</b>               | A device that allows you to see other layers in transparency while you are working on a particular layer.   |
| <b>line of action</b>            | The direction that the action will follow. Also known as <i>path of action</i> .  |
| <b>lip-sync</b>                  | The character's mouth synchronization with the dialogue sound track. Frame by frame, the mouth will be adjusted to fit the sound to give the illusion of the character is speaking.   |
| <b>low resolution</b>            | A format that is ideal for videos destined for the web, where size and fast download of a video file take precedence over quality. A low-resolution image is one that lacks fine detail.  |
| <b>manual lip-sync detection</b> | The manual swapping of mouth position drawings to match a voice track. For this process, both sound scrubbing (listening to a sound wave broken up frame-by-frame) and drawing substitutions are used.  |

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| <b>master palette</b>                 | A group of colours attributed to a character or prop. The palette is used throughout the entire production to maintain consistency in the look and to ensure that the same colours are used throughout the production. Also known as <i>palette</i> .   |
| <b>model/colour model</b>             | The definitive character, prop or location design each artist must follow for a production. A colour model is the official colour design that must be used to paint the animation.  |
| <b>motion keyframe</b>                | A keyframe with computer-generated interpolation.   |
| <b>mouth chart</b>                    | A chart based on the eight animation phonemes (A, B, C, D, E, F, G, and X, which is used to represent silence) used for lip-sync.   |
| <b>multiplane</b>                     | The effect of passing through multiple levels of drawings to create a sense of depth in a shot. A multiplane is a scene in which the layers are placed at different distances from the camera so that when the camera moves, a depth illusion occurs. With a multiplane, all the perspective and scale is calculated automatically. |
| <b>NTSC</b>                           | The standard analogue television broadcasting system used in North America. NTSC conforms to North American standards on how rectangular pixels are displayed for computer and television screens.  |
| <b>nudge</b>                          | A small push (left, right, up, down, forward or backward) done with the keyboard arrow keys on a selected element. Nudging is used to move a selection very slightly and precisely.   |
| <b>onion skin</b>                     | A feature that lets you see the previous and next drawings of a sequence.   |
| <b>overlay</b>                        | A part of the scene environment, such as a chair or a bush, that is placed in front of the main animation.  |
| <b>PAL</b>                            | A resolution that works best with the European format for television and computer screens, as the rectangular pixels are displayed at a different orientation.  |
| <b>palette/master palette</b>         | A palette or master palette is a group of colours attributed to a character or a prop. The palette is used throughout the entire project to maintain a consistency in the look and avoid the colour changing during the animation. Also referred to as a master palette.  |
| <b>palette style</b>                  | A palette style is a second version of an existing palette with a slight change in the tint and value. A palette style can be used to create the night version of a palette. It may also be called a clone palette.   |
| <b>pan</b>                            | To move the camera across the scene in any direction.   |
| <b>panel</b>                          | In a storyboard, a panel is a frame in a shot. A shot can be composed of one or several panels.   |
| <b>paperless animation/tradigital</b> | The paperless animation process is the action of animating digitally. The main paperless animation process is to draw, frame by frame, the animation directly in the software.  |
| <b>passing position</b>               | When drawing a walk sequence for a character, the passing position is the point at which one leg passes the other.  |
| <b>path of action</b>                 | Direction that the action will follow. Also known as <i>line of action</i> .  |

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| <b>peg</b>                    | In traditional animation, a tool used to ensure accurate registration of action as cel layers move. In digital animation, in which you are doing a more advanced puppet rigging, you can use peg layers. Peg layers are trajectory layers that do not contain drawings. They are motion paths that you can use to add path articulations. For the latter, you can also use the Inverse Kinematics tool.          |
| <b>phoneme</b>                | A unit of sound in a language.   |
| <b>pivot</b>                  | The point around which a peg or drawing rotates.   |
| <b>pixel</b>                  | The smallest element of an image displayed on a monitor or TV screen.<br><br>Pixel, short for <i>picture element</i> , is a single point in a graphic image. It is a small sample of an image, a dot, a square, or a very small section made out of smooth filtering. If you zoom in close enough on a digital image, you will see the pixels, which look like small squares of different colours and intensity. |
| <b>pose-to-pose animation</b> | The pose-to-pose animation process is the action of creating all the main action poses, called <i>key poses</i> , and then placing the secondary poses between the keys. The secondary poses are called <i>breakdown</i> . Finally, the animator fills the gaps with the in-between drawings to achieve a smooth animation.  |
| <b>rendering</b>              | The final step when animating by computer. During rendering, the computer takes each pixel that appears on screen and processes all of the components, as well as adding motion blur before it produces a final image. The process of calculating the final images after the compositing process.  |
| <b>resolution</b>             | The size of a scene, generally calculated in pixels. For example, the NTSC resolution is 720 x 480. The resolution should match the final output: HDTV, film-1.33, film-1.66, NTSC, PAL, low.  |
| <b>RGB</b>                    | Red, Green, Blue. A method of defining colour by specifying amounts of these three colour components.  |
| <b>rigging</b>                | The process of attaching the various parts of a cut-out puppet.  |
| <b>rotary table</b>           | Equivalent to the animation disk/table, a device that allows you to rotate the workspace for greater comfort while drawing.  |
| <b>rotoscoping</b>            | An animation technique in which animators trace over live-action film movement, frame by frame, for use in animated films. The act of sketching over live-action footage to create an animated sequence.   |
| <b>roughs</b>                 | The skeleton sketch of an animation or design. Roughs mainly consist of sketch lines and shapes, though they can also contain design details.  |
| <b>safe area</b>              | The zone at the center of a scene's frame that is safe from being cropped by the TV frame. As a TV frame cuts a margin off the original frame size, maintaining a safe area ensures that the scene's main action will remain clearly visible once the film is screened on television.  |
| <b>scene</b>                  | A shot in a movie or show. A sequence is composed of several scenes. A scene changes to another scene by a simple cut or transition.   |
| <b>script</b>                 | The original text containing all the movie or show information. In animation, the script contains all of the location descriptions, dialogue, time and more. A project starts with a script.   |

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| <b>sequence</b>              | A series of scenes or shots forming a distinct part of the story or movie, usually connected by unity of location or time.  |
| <b>shot</b>                  | A scene in a movie or show. A sequence is composed of several shots. A shot changes to another shot by a simple cut or transition.  |
| <b>slow-in</b>               | The gradual acceleration in the action. Also known as <i>ease-in</i> .  |
| <b>slow-out</b>              | The gradual deceleration in the action. Also known as <i>ease-out</i> .   |
| <b>slugging</b>              | To indicate the start and stop times of dialogue and relevant actions.  |
| <b>sound scrubbing</b>       | A process that lets you hear sound in real time while you move the playhead forward or backward. This is very useful for finely-tuning a lip-sync.  |
| <b>stop-motion keyframe</b>  | A keyframe with no computer-generated interpolation.  |
| <b>storyboard</b>            | A visual plan of all the scenes and shots in an animation. The storyboard indicates what will happen, when it will happen and how the objects in a scene are laid out.  |
| <b>straight-ahead</b>        | A technique in which an entire sequence is drawn from the first position to the last, in order. There is very little planning in this methodology. Where the character ends up and how it gets there can be a surprise for both the audience and the animator. While this approach is spontaneous and creative, it can create inaccurate results. |
| <b>strokes</b>               | Invisible vector lines forming the drawing zones. They can be adjusted with Bézier handles.   |
| <b>tablet/pen</b>            | A device used in conjunction with, or instead of, a mouse to move a mouse pointer (sometimes referred to as the <i>cursor</i> ) around the computer screen.   |
| <b>template</b>              | An asset stored in the library that can be reused in any project. A template can be a drawing, a series of keyframes, a sound file, a panel, a cut-out character, an effect, a trajectory, an animation, or anything else used in the animation.  |
| <b>thumbnails</b>            | A very small image used as a reference or indicator.  |
| <b>timecode</b>              | The timing information printed on a movie clip to indicate the scene, hour, minute and second that is currently displayed on the screen.  |
| <b>timeline</b>              | A horizontal representation of a scene's elements, timing and keyframes.  |
| <b>trace and paint</b>       | After the rough animations have gone through cleanup and a final line or pencil test, each drawing is traced and painted for the final animation. In today's digital world, this may be done in a variety ways other than the traditional celluloid or acetate methods.   |
| <b>track breakdown</b>       | The break down of an animated film's soundtrack into individual sounds to produce the precise frame-by-frame position of each sound.  |
| <b>traditional animation</b> | A type of animation process whereby all the animation sequences are drawn by hand on paper before scanning or inking them on cels.  |
| <b>trajectory</b>            | A computer-generated path or trajectory that elements can follow. The trajectory can be controlled by control points, keyframes and velocity.   |
| <b>transition</b>            | An effect placed between two scenes as they pass from one to the other. Common transition effects are cross-dissolve and wipe.  |

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| <b>underlay</b>                | In animation, an underlay is a specific part of the decor placed behind the main animation.  |
| <b>aspect ratio</b>            | The aspect ratio describes the shape of the grid unit. A square grid unit would have a 1:1 ratio , whereas a grid unit of aspect ratio 4:3 is a unit with one side 1.33 times as big as the other side.  |
| <b>vector</b>                  | A vector-based image is composed of points and Bézier curves. The computer reads the points and traces the segments, linking them to reproduce the image shape. There is no fixed size or resolution in a vector image. The graphic can be enlarged and distorted as much as desired and the system will simply recalculate the segments and rebuild the shapes. Vector images are translated and displayed in pixels once the calculation is done.  |
| <b>velocity</b>                | In animation, the velocity, also known as <i>ease</i> , is the acceleration or deceleration of a motion. This can be achieved by a function curve, or via a series of animated drawings. Other common terms for ease-in and ease-out are <i>slow-in</i> and <i>slow-out</i> .  |
| <b>walk cycle</b>              | A series of drawings "on the spot" that describe the walk for a character. The illusion of movement is created by the use of background pans. To avoid making innumerable drawings, animators routinely make a walk cycle for a character.   |
| <b>Xsheet (exposure sheet)</b> | <p>The Xsheet or exposure sheet, is a sheet with several vertical columns and horizontal frames used to indicate a scene's timing.</p> <p>Each column represents a scene's layer. In each column, the drawing numbers are indicated and spread over the specific number of frames in which they appear.</p> <p>The exposure sheet is used by animators, directors and other members of the crew to track the sequence and timing of images, dialogue, sound effects, sound tracks and camera moves. Also known as <i>dope sheet</i>.</p> |
| <b>zone</b>                    | An area which can be painted with colour.  |

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